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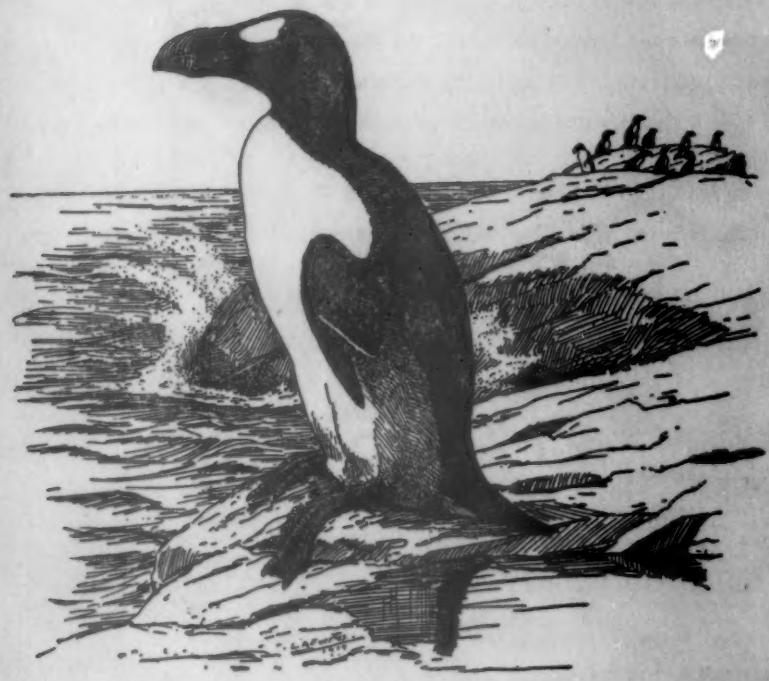

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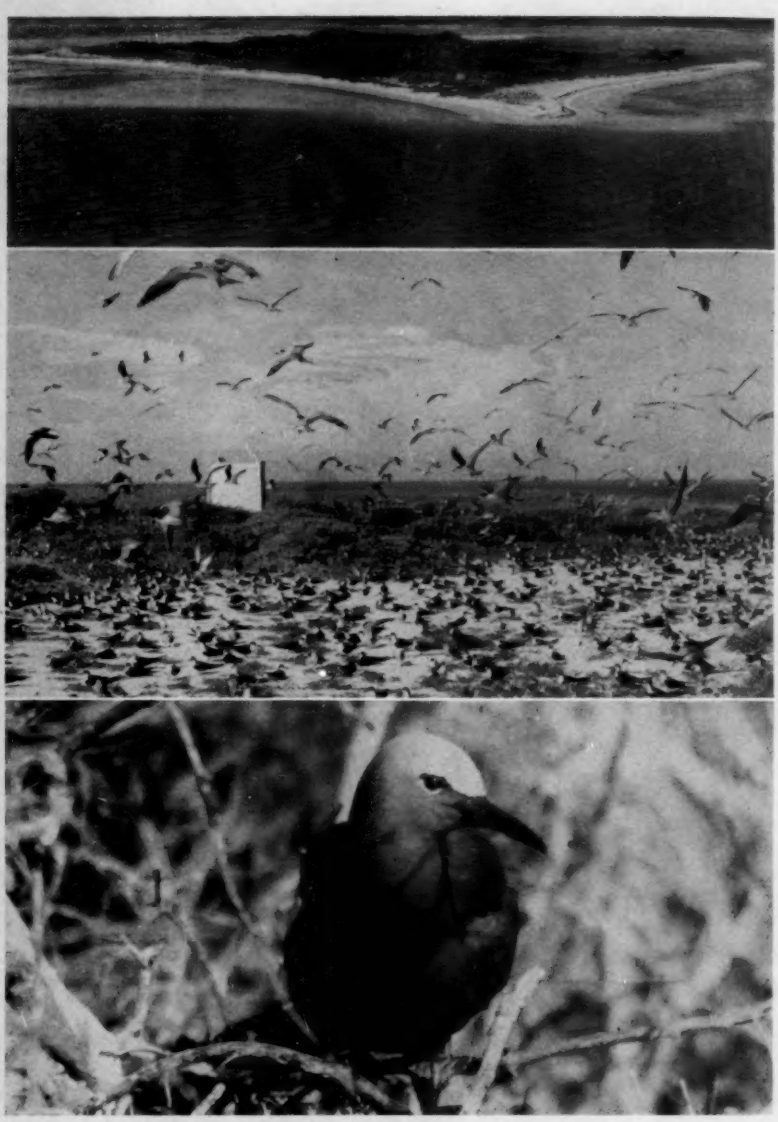

(*Top*) BUSH KEY, DRY TORTUGAS FROM SOUTHEASTERN BASTION OF FORT JEFFERSON. NESTING SOOTY TERNS VISIBLE ON SANDY AREAS. (*Middle*) PORTION OF NESTING COLONY OF SOOTY TERNS. (*Bottom*) NODDY TERN AT NEST; TAKEN AT FOUR FEET WITHOUT BLIND.

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A QUARTERLY JOURNAL OF

ORNITHOLOGY

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THE TERN COLONIES OF THE DRY TORTUGAS KEYS

BY ALEXANDER SPRUNT, JR.

Plates 1, 2

ALTHOUGH they constitute one of the earliest-known bird concentrations of North America and have a reputation among ornithologists which is country-wide, the great colonies of Sooty and Noddy Terns (*Sterna fuscata fuscata* and *Anous stolidus stolidus*) of the Dry Tortugas probably remain the least visited of such natural wonders in the United States. This is, however, by no means because of preference. There are scores of ornithologists who would give a good deal to make the journey there, and indeed, cherish it as a primary objective. Not long ago one of the outstanding nature photographers of the country, in a letter to the writer, stated: "I've dreamed of getting there for twenty years." His attitude can be duplicated by many.

Of the three greatest avian sights on this continent, the Tortugas tern colonies are certainly the last in first-hand field contact, for there is little doubt but that both the Aleutian and Bonaventure Islands concentrations have been seen by more observers than these sandy keys in the Gulf of Mexico.

The term 'remote' well describes them. Although within seventy miles of an American city, itself something of an oddity among cities in being the most southern of any, they seem a great deal farther than miles indicate. Most visitors to Key West conclude that they are already at the end of everything generally, beyond which lies nothing but the heaving expanse of great waters. And yet, out beyond the horizon, lie these storied spots of sand and coral, some 68 miles still to the westward but to all intents and purposes of 99.9 % of Key West tourists, they might be on the moon! None the less, those who have persevered thereto would probably be unanimous in agreeing that the trip was well worth the effort, for in point of history, beauty, fascina-

tion and interest, the Dry Tortugas loom as one of the great highlights of a traveller's wanderings and, once having been there, he or she determines to return.

If one flies, the trip is as nothing, for 30 minutes out of Key West will land one at the massive, all but incredible bulk of old Fort Jefferson. If by boat, it is a different matter, entailing some five to eight or ten hours, depending on what manner of craft is utilized. The writer has been fortunate enough to make both sorts of trips on repeated occasions, and holds each one as an experience beyond compare. Having held intimate companionship with the avian dwellers there for the past two seasons (1945 and 1946) in making the first post-war population counts of their teeming myriads, he feels that this account of their status today, after another World War, will be of interest to many.

HISTORY

No account of present-day conditions at the Tortugas would be complete without at least a brief glance into their venerable history. The islands were first seen by European eyes, as far as is known, only twenty-one years after Columbus landed on San Salvador. On June 21, 1513, Ponce de León landed on "the eleven rocky islets" upon which, because of the great numbers of marine turtles found there, he bestowed the name Las Tortugas.

His historian, Herrera, states that aside from their securing as many "tortoises" as they wished, "there were killed many pelicans and other birds that amounted to five thousand."

Fifty-two years later, an English slave trader, one John Hawkins, came to the Tortugas on July 1, 1565. Again supplies of turtles and birds were secured and the numbers of each were so impressive as to find expression in the written record as follows: "The Capt. went in with his pinnesse, and found such a number of birds, that in halfe an houre he laded her with them; and if they had beene ten boats more, they might have done the like." Following this is a reference to the turtles and the observation that those "certeine islands of sand beare the name of Tortoises."

It will be noted that in neither of these ancient references are the numerous birds identified as terns. Indeed, it was not until more than two hundred and fifty years later that they were definitely named, but the writer has no doubt whatever that the teeming multitudes seen by Ponce de León and Hawkins were exactly what one sees there today. No good reason exists why this is not the case.

Since the birds, when identified, had apparently been using the

Tortugas as an ancestral breeding site, it is safe to assume that they "always had" and the finding of them in 1513 certainly makes these colonies one of the oldest bird rookeries of North America.

Though no doubt visited by fishermen, buccaneers and what-not, between 1565 and the 1800's, it remained for the indefatigable Audubon to really place the Tortugas colonies on the ornithological map by identifying the swarming birds as Sooty and Noddy Terns. He landed there on May 9, 1832, and what he found and described is too well known for further comment here.

A quarter century after Audubon's visit, Gustavus Wurdemann worked at the Tortugas (1857) studying and collecting birds (it was for him that the hybrid between Ward's Heron, *Ardea herodias wardi*, and the Great White Heron, *Ardea occidentalis*, was named).

In 1859 some ornithological collecting was done there by Capt. D. P. Woodbury, followed closely in the same year and the next by Dr. J. B. Holder. Though there is quite a gap after these workers, such interim represents the period of the War Between the States and the dark times which succeeded it. True, activities at the Tortugas were intense, but not of a nature connected with ornithological research. It was then that the now famous Dr. Samuel Mudd contributed his sacrificial efforts at combating the scourge of yellow fever which swept the garrison of Fort Jefferson, where he was a political prisoner.

Near the close of the last century, birds again occupied the study of some, and the most prominent worker of this period was W. E. D. Scott, who was active at the Tortugas in 1890. He prepared what appears to be the first real list of birds from that area. Just at the turn of this century, 1901–1902, a Dr. Joseph Thompson, U. S. N., was stationed at the Tortugas and, being interested in birds, made notes on the tern colonies and embodied them in a popular article which was produced in Bird-Lore, 5: 77–84, 1903.

It was not until the early years of this century that really intensive work began by modern ornithologists. One of the early photo-ornithologists, Herbert K. Job, visited the Tortugas in May, 1903, and stayed for several days on Bird Key, photographing and observing both the Sooties and Noddies. Some of his pictures appear in his volume 'Wild Wings' (1905) and are excellent. Job made an estimate of the bird population, one, if not the first, of the counts of this century, thus giving a basis for comparison (*see* Population).

Probably the most famous of the Tortugas studies was carried on by Dr. John B. Watson of Johns Hopkins University. His work on the behavior and homing instincts of the Sooty and Noddy Terns was a masterly endeavor (Papers from Dry Tortugas Lab. Carnegie Inst.,

2, 1908; Papers from Dept. Marine Biology, Carnegie Inst., 7, 1915). Watson first worked there in 1907 and again in 1910–1911–1912, and was assisted in 1913 by Dr. K. S. Lashley. Detailed studies of the colonies were carried on from 1913 to 1917 by Dr. Paul Bartsch of the U. S. National Museum, who contributed numerous papers on his observations, dealing with marine life as well as the birds. Much of his study is summarized in his paper on the breeding birds (Bird Rookeries of the Tortugas, Smithsonian Report, No. 2612, 1917). Soon after the termination of his work, World War I broke upon the scene and a considerable hiatus appears to have existed between that conflict and the year 1935.

In that year the Florida Audubon Society undertook an expedition to the Tortugas to make a population count of the tern colonies. Thereafter, through 1941, annual trips and counts were made, until World War II intervened and the Tortugas became an important anti-submarine base in the conflict against the U-boats operating in the Gulf of Mexico and Caribbean Sea. The findings of these groups appeared in various issues of the Florida Naturalist (vols. 9–15, Jan., 1936 and Oct., 1936–1941).

James O. Stevenson and Daniel Beard, Jr., of the National Park Service, did some work among the Tortugas terns during the period that the Florida Audubon observers were active. Beard carried on a rodent-control campaign against rats on Garden and Bush Keys, which had become a serious menace to the birds. Jack Russell of Sanford, Florida, assisted in this program.

In the war year of 1942 the Superintendent of Fort Jefferson, R. R. Budlong, estimated the tern population but no counts whatever were made in 1943–1944. In 1945 and 1946 the writer made the counts for the National Park Service, thus carrying on the efforts to keep abreast of the situation.

Keys Utilized by Terns

Through one cause or another, the "eleven rocky islets" of Ponce de León's day in 1513, now number six. Eleven years ago there were seven, but Bird Key disappeared in the great Labor Day hurricane of 1935 and has not yet reappeared. For generations it was *the* key of the tern colonies. The studies of Job, Bartsch, Watson and others were all made thereon. Since 1935, however, two other islands have figured as nesting sites, with the terns now concentrating on but one. In 1937, Garden Key, where stands that monumental structure Fort Jefferson, was utilized to some extent, as was also Bush Key, a hundred yards or so across the channel. This is the first instance, in

modern times at least, that Garden Key was occupied. Similar nesting, to a lesser extent, occurred there in 1938 and 1939. In 1940 all nesting took place on Bush Key and has continued to be confined there through 1946.

Bush Key has an interesting history. At the turn of this century it was so small as to be hardly noticeable. John H. Davis (Ecology & Topography of the Sand Keys of Florida, Papers from Tortugas Lab., 33, Nov., 1942) states that "Lansing evidently found so little sand above the wash of the waves in 1904 that he gave no account of the island." Since then, however, it has grown considerably and again quoting Davis, shows "more changes in both topography and vegetation . . . than any other of the now existent Tortugas Keys."

From the above one might infer that Bush Key is of very recent origin. This, however, is by no means the case when one considers what Bartsch says about it. He mentions it as having been there in Audubon's time (1832) with the following reference. Commenting on Audubon's remarks anent the Noddy, Bartsch says that "This sketch is the more interesting on account of the fact that the birds no longer breed upon the key (Bush Key) on which he found them nesting, as all the vegetation, in fact, most everything shiftable above the sea, has long since been swept away by the waves."

This statement is of double interest, for it not only places Bush Key as having existed in 1832, but also shows that it was barren of vegetation as recently as 1917, that being the year Bartsch finished his work there! So then, 85 years prior to Bartsch's time, Bush Key was densely grown up, but at the beginning of this century was so small as hardly to be noticeable. Since Job, in 1903, mentions only Bird Key as the nesting place for both Sooties and Noddies, he must have overlooked Bush Key completely. However, in the succeeding years when it was building again, the growth of both key and vegetation must have been rapid for in 1915 it was found to be supporting *Suriana* and *Tournefortia* bushes "about 12 years old" (Davis). And yet, *two years later*, in 1917, Bartsch says that "Bush Key now appears as an elevated coral reef with piles of organic detritus heaped up in spots but barren of vegetation"! The only explanation of such rapid deterioration would appear to have been the result of a hurricane which took off the vegetation but left the key itself.

Today Bush Key comprises some twenty acres, which exceeds the extent of Garden Key (Fort Jefferson). In shape it is a well-defined diamond with a long sand spit extending from the eastern tip, pointing to the southward at almost a right angle to the body of the key. The western tip now comes very close to the edge of the channel

separating this key from Garden Key. There are two small ponds on it, the easternmost ringed about by white and red mangroves (*Laguncularia racemosa* and *Rhizophora mangle*, respectively), and some bay cedar (*Suriana maritima*). The western pond is much more in the open, with prickly pear (*Opuntia* sp.), glasswort (*Salicornia* sp.) and sea lavender (*Tournefortia* sp.) growing about the edges. The last two plants now cover large areas of the key and even in a single season their growth is marked and continues to be rapid. The Sooties use the bare sand areas and also breed in the short growth of *Salicornia* when this plant is about two or three inches high. When it reaches greater heights the birds do not use it. The Noddies confine their nesting entirely to bushes and mainly those of the bay cedar (*Suriana*).

ARRIVAL AND DEPARTURE

Not the least interesting phase of the Tortugas tern colonies is the character of arrival and departure of both Sooty and Noddy—to a minimum degree it is regarded by native fishermen somewhat as the advent of the swallows of Capistrano! In other words, if not held as a miracle, at least the conviction is extant that the birds arrive and depart on exactly the same day each year and, if it varies at all, it is held to be due to certain phases of the moon!

As in all migratory species, remarkable regularity attends the movements of the Tortugas terns. Generally speaking, they arrive about the middle of April and leave the middle of September, thus making a five-month stay at the nesting area. Dates vary from the first part of April to the last of that month for arrival, and from mid-August to late September for departure.

Very early arrivals sometime occur in late March. National Park Service records by J. B. Felton include March 27, 1940; early departure has been noted on August 9, 1911. Therefore, maximum dates can stretch over six and a half months; all such dates, of course, concern Sooties and Noddies alike.

Arrival is always at night and for about two weeks, more or less, the birds are to be seen or heard only after dark. Cruising about over the nesting key, they do not land but fly constantly, disappearing at daylight only to return again at dusk. The descent to the sands seems to be by common consent, and egg laying takes place the day after landing, or very shortly thereafter (the natives insist that the eggs are laid within a half hour of landing).

NESTING

Both the Sooty and Noddy lay but one egg as a rule. This fact is so well known now that it seems trite to call attention to it, but some confusion may exist by reason of past statements on the part of writers. One such was no less than Audubon, himself, who stated definitely: "The Sooty Tern always lays three eggs as its full number."

This seems very strange. It appears hardly possible that Audubon could have been mistaken, but unless he was, the only alternative that presents itself is that the birds have changed their habits. This seems just as unlikely. At any rate, the Sooty now lays but one egg, *sometimes* two. In Watson's exhaustive studies, he found but 25 instances of two eggs among the thousands he saw and watched. It is interesting further to note that among these 25, only one of the multiple sets resulted in two young being hatched and brought up!

During the 1946 season the writer saw tens of thousands of Sooty nests on Bush Key and amongst that multitude of single eggs were nine examples of two in a nest.

Regarding the Noddy, Audubon makes the same astonishing statement that he does about the Sooty, viz.: "The Noddy, like most other species of Terns, lays three eggs . . ." Actually only one is laid. In none of the writer's observations, either since World War II or before it, has he ever seen two eggs in a Noddy's nest. It is, of course, true enough as Audubon says that "most terns lay three eggs." It might be qualified to the extent of saying that the medium-sized terns do, while the larger ones lay but one, and the smallest of all, the Least Tern (*Sterna antillarum antillarum*) lays two or three.

As already mentioned, the Sooty invariably nests on the ground and the Noddy just as invariably nests in bushes. In appearance the eggs of both are superficially similar but those of the Sooty are much more rounded and less elongated than the Noddy's. In the former, the ground color is white or creamy buff with numerous rather small markings of dark brownish or gray. These vary infinitely; no two eggs look exactly alike. Sometimes the spots spiral slightly; most of the time they are rounded and clearly defined. The size averages 50 x 35 mm.

The egg of the Noddy is ovate, sometimes markedly so, the ground color is buffy and the spots are far more sparing than those of a Sooty's egg. Frequently they are grouped about the larger end, and are dark reddish or brown, with some of lilac. Now and then an almost immaculate egg is seen. The size averages 52 x 35 mm.

According to Watson, incubation consumes 26 days for the Sooty

and about a week longer for the Noddy. Young are on the wing in two months. Both sexes incubate.

The outstanding feature of the Tortugas colonies is the tameness of the birds. In few other spots except such as the gannet rocks of Bonaventure, can one get so close to birds as here. Frequently one can touch Sooties with hand or foot, and the Noddy allows itself to be picked up from the egg. Indeed, with the latter, in order to get a picture of an egg, it is sometimes necessary to pick up the sitting bird and set it aside! The air all about one is full of birds from knee level on up, and the masses of them are so close at hand that occasionally a bird can be seized out of the air. The din is terrific, at times completely bewildering and unreal, and it keeps up all day and all night. Not a moment during the nesting season does quiet reign on Bush Key.

POPULATION COUNTS

Anyone landing on Bush Key during the nesting season can hardly fail to ask the question: "How many birds are here?" Comparatively few have done more than wonder about it, however, as counting them appears an utter impossibility at first glance. Literally, it is rather out of the question to ascertain exact numbers, but they can be fairly approximated, and this is the basis for what population figures have been secured.

Curiously enough, none of the Nineteenth-Century observers did anything about counting the terns. Just why, it is difficult to say unless large bird concentrations in that time were more or less the rule, and did not excite the enthusiasm they do now. In spite of his undoubted astonishment at the numbers of the Tortugas terns, Audubon either made no estimate at all, or omitted any reference to such if he made one. Illustrative of his impressions however, he remarks: "On landing, I felt for a moment as if the birds would raise me from the ground, so thick were they all round. . ."

It seems that it was not until the early years of this century that any population counts were made, and the first of these was by Herbert K. Job in 1903. In his already mentioned 'Wild Wings' (Houghton, Mifflin Co., 1905) Job estimated, or to quote him, ventured a "guess" at the population of Sooties at "six or eight thousand" and "of the noddies there are hardly a thousand," which, he adds, "is a great decrease from the numbers that were once here." This is all that he says and on what he bases his statement that there had been a "great decrease" he does not say. Probably it was the account of Audubon which would certainly lead one to believe that there were more than six or eight thousand birds there then. It is interesting to speculate

here, exactly why this decrease occurred. We can do no more than guess at it, but weather, egging, the feather trade, general shooting and lack of conservation all doubtless played a part.

None the less, this seems to have been the low ebb of the Tortugas colonies for all time and the writer wonders if the cause might not well be the occupation of the Tortugas by garrisons of soldiers and navy ships during the Spanish-American War. Great activity reigned about Fort Jefferson in 1898. The coaling docks at Garden Key were built then and in view of the tendency of many men in a remote spot to exploit the wildlife for both food and sport, it seems very likely that the terns were greatly reduced by this human invasion of their haunts. Be that as it may, Job's figures are the low point. It would be tremendously interesting if some comparable ones were available for the period of the middle and late 1860's, when Fort Jefferson was the focus of another war's activity, and so much of its history took place.

Used as a Federal outpost and prison, its garrison beset with idleness, tedium, and what was worse, yellow fever, the Tortugas terns must have come in for a share of suffering and depletion. The bodies of those soldiers dying either natural deaths, or plague-stricken, were buried on Bird Key, the nesting site of the terns, and it is not to be supposed that interference of this or other nature was without detriment to the annual avian summer residents.

Dr. Watson's celebrated studies in 1907 and 1908 included population estimates, and an improvement is to be noted between his figures and Job's—a considerable improvement, in fact, and an indication that cessation of military activities in the area may well have been to the advantage of the birds. Watson's counts showed in 1907 that there were 18,000 Sooties and 4,000 Noddies. In 1908 there were 20,000 Sooties and 1,400 Noddies. The Noddy count of 1907, by the way, together with one by Paul Bartsch in 1917 of an identical figure, and another in 1936 by the Florida Audubon Society, constitute the all-time high for this species in count histories. At no time has this bird exceeded 4,000.

From Bartsch's estimate in 1917 until 1935 when the Florida Audubon observers began their work, there is a gap in the records, but from then through 1946, a period of 11 years, there are only two seasons without a count, these being the war years of 1943–1944. This is, by a good deal, the most consecutive set of figures which have ever been compiled, and it is hoped that annual counts may be continued in the indefinite future.

Given below is a table listing the counts to date:—

Year	*Estimator*	*Sooty Tern*	*Noddy*
1903	Herbert K. Job	6000–8000	400
1907	John B. Watson	18,000	4000
1908	John B. Watson	20,000	1400
1917	Paul Bartsch	25,000	4000
1935	Fla. Audubon Soc.	30,000	3000
1936	Fla. Audubon Soc.	40,000	4000
1937	Fla. Audubon Soc.	100,000	2000
1938	Fla. Audubon Soc. & Beard	64,058	413
1939	Fla. Audubon Soc.	70,000	250
1940	Fla. Audubon Soc.	100,000	180
1941	Fla. Audubon Soc. & Peterson	100,000	1000
1942	Nat. Park Ser. (Budlong)	65,000	450
1945	Alex. Sprunt, Jr.	109,000	750
1946	Alex. Sprunt, Jr.	97,200	550

Counts in recent years have been based on the square-yard unit system. Striking an average of the breeding birds to the square yard, and ascertaining the area utilized, figures are computed therefrom. It seems to be the only reasonable way to undertake the work. This, of course, applies to the Sooty Tern. The nesting density varies considerably. In some of the favored areas it is amazingly crowded, in others very scattered. All grades of intermediate conditions may be encountered. Illustrative of this is that, during the 1946 season, the writer found a density of as much as five birds to a square yard as a maximum, and 0.5 to the square yard as a minimum. Much depends on the growth of *Salicornia* or other plants in which the Sooties are nesting. The final conclusion reached in June, 1946, was that 10,700 square yards averaged three nests per unit and that 16,500 square yards averaged one nest per unit. Thus, doubling for the pair of birds, we get 64,200 plus 33,000, or 97,200 Sooties.

A similar system cannot be used for the Noddy because of its bush-nesting habit. However, it is simplified by the fact that a 1-2-3 count can be made of the nests, or very nearly so. Then, too, the Noddies are in the tremendous minority. The writer has been under the impression that, in some recent counts, the Noddy has been more or less neglected or guessed at. In 1946, therefore, he made a particular effort to get as nearly accurate figures as possible. A careful search of Bush Key for individual nests was undertaken. Of course, a few nests in especially dense thickets of bay cedar (*Suriana*) were no doubt overlooked. It was possible also to check against the nest count by counting the actual birds during certain times of day when they congregate on the coaling docks of Garden Key for resting.

This is a marked habit of the Noddy, not shared by the Sooty. They pick out a favored location and line up thereon, side by side, and a close count is possible.

The 1946 Noddy nest count amounted to 246 actual nests. Allowance was made for overlooked ones, and a total of 275 arrived at. One count of resting birds amounted to 185, another to 242. Doubling these for a pair, we get 370 birds and 524 birds. Thus, the figure for the whole Noddy population (550) seems fairly accurate.

Whatever detriment the Tortugas terns may have suffered in past wars, World War II appears to have had no such effect. Modern conservation ideas and methods and the rigid protection afforded the birds since the Tortugas have become a national monument can be assigned as the principal reasons for the fact that virtually no damage resulted in the recent occupation of these islands by naval forces. Today the colonies are in splendid condition except for the uncertain situation surrounding the Noddy population—at the present time, an unaccountable one.

OTHER TERNS

Though one all but automatically considers the terns of the Tortugas as Sooties and Noddies, other species nest there also, at least occasionally. The one most apt to do so is the Roseate Tern (*Sterna dougallii dougallii*), thereby presenting a remarkable instance of avian distribution. Breeding in a rather local manner on the Atlantic coast from Sable Island, Nova Scotia, south to Virginia, it ceases to do so south of Cobb's Island in that state, and does not reappear as a nesting bird until it presents itself in the Gulf of Mexico at the Dry Tortugas!

The colony is never a large one and shows much fluctuation in numbers. Apparently, counts of these terns were not as interesting to members of the Florida Audubon Society's expeditions as were those of the Sooty-Noddy combination, but are given below as the only recent data available.

Year	*Birds*
1936	400
1937	—
1938	314
1939	80
1940	20
1941	—

There was no count at all in 1942–1943–1944. In 1945 the writer examined the Roseate colony with some care and found 85 nests. Checks with birds in the air above the nesting site varied from 160 to

180. The figure 170 can be accepted for the 1945 population. In 1946 not a single Roseate Tern was present at the Tortugas in June! For the several days the writer was there, a vigilant watch was maintained, all but hourly indeed, and not a bird was seen. The reason is unknown.

These birds, when present, always occupied the bare areas of the sandspit extending from the eastern tip of Bush Key.

Other occasional nesting terns are the Common Tern (*Sterna hirundo hirundo*) and Least Tern (*Sterna albifrons antillarum*). Neither occurs in any numbers much exceeding a dozen pairs each.

PREDATION

The Tortugas tern colonies are as free from human molestation as any bird concentration could well be, perhaps any in the world. The custodian of the Fort Jefferson National Monument is in permanent residence only a few hundred yards from Bush Key, and any disturbance there, night or day, could and would be immediately dealt with. The once prevalent practice of "egging" is now as much history as Fort Jefferson itself, and need never again be considered as a menace to the birds. Only through a too enthusiastic attention by visitors could the human element become detrimental and this phase is watched carefully by the National Park Service which has definite rules of procedure governing visitors.

Therefore, natural enemies are the only sort with which the terns have to contend and, viewing the past consequences of these, they appear to be innocuous on the whole, with a few exceptions. One of the latter was the presence of the Norway rat (*Epimys norvegicus*) at the Tortugas, brought in by Cuban fishing schooners, or visiting spongers, fishermen, and the like. Probably not noticed for some time because of vegetation and the secretiveness of these rodents, they nultiplied in numbers until, in 1937, Jack C. Russell, doing biological research for the National Park Service at the Tortugas, estimated that rats destroyed 90 % of the Noddy eggs and young (Fla. Nat. 9: 8). Obviously, control was in order and was instituted before the birds returned in 1938. Dan Beard, then of the Park Service, was concerned therewith. The campaign was an unqualified success. All surveys since have revealed a virtual absence of rats on Bush Key, though a few remain amidst the gigantic pile of Fort Jefferson. Neither in 1945 or 1946 did the writer find any evidence of rats among the nesting terns on Bush Key. That menace, therefore, has been removed, and any possible recurrence is being watched for.

Sand-crabs (*Ocypoda arenaria*) and Man-o'-war-birds (*Fregata*

magnificens) constitute the present natural enemies, aside from weather, of the Tortugas colonies. Unfortunately, few specific data on the depredations of either can be given now. That the Man-o'-war-bird does take young terns is certain; it has been seen to do so, but not to the extent of serious inroads. Curious contradictions appear in the accounts of the behavior of these sable pirates. Members of the Florida Audubon expeditions have stated definitely that they have actually witnessed the capture of young Sooties by them (Robinson, G. D., Fla. Nat., 13: 7). And yet, Mr. C. Raymond Vinten, Co-ordinating Superintendent of Southeastern National Monuments, found a half-starved Man-o'-war-bird on Bush Key in 1937, with a broken wing. He says that: "It was roosting in an area where the ground was covered with hundreds of eggs and chicks, but it was starving whiles urrounded with an abundance of food within easy reach." Thus does behavior differ.

In June, 1946, the writer saw Man-o'-war-birds swoop low over the sands of Bush Key on several occasions, seize something and swallow it, and immediately fly out over the water and drink. Mr. Vinten and the writer's son also observed this maneuver independently, but although the plain inference is that young Sooty chicks were seized, we never could quite get a definitely satisfactory instance.

Much the clearest statement of positive predation by Man-o'-war-birds, is that of Daniel B. Beard in The Auk, 56: 327, 1939. Beard watched it on several occasions and leaves no room for doubt as to its indulgence. The Sooty chicks are seized by the attacker swooping low and grasping the victim without a break in the flight. Beard saw 18 chicks thus secured in one evening. (He also refers to the habit of the Man-o'-war-bird in immediately drinking after swallowing a chick.) Though apparently the damage from this cause is not considerable, more study is needed to arrive at a certain percentage of the take, and with that in hand, clearer ideas of what might be done can be formed.

Damage by the sand-crab is undoubtedly considerable. These ghostly creatures, swift and silent, are very abundant on Bush Key and appear to be increasing annually. As mentioned above, there are no figures available, but future observers would do well to give careful attention to this situation if time permits. Bartsch has seen young Least Terns mutilated by having their wings clipped off by this crab which, of course, would be fatal even if the crab were driven off. No doubt its tactics with Sooty chicks are similar. It is when the latter are hatching that most of the predation occurs.

Another such enemy, at least at times, appears to be the hermit

crab, and of it, Robinson (1940) says that: "Bush Key has become the happy hunting ground for thousands of hermit crabs which were found to be feasting upon the newly hatched sooties, or partially hatched ones." It seems strange indeed that this creature would be able to 'get away' with such actions. Evidently it is only when very young birds, unattended, are available to it, and this would not appear to be often. The adult Sooty could certainly repel any attack by one of these crabs, and, as a matter of fact, the young bird itself, when able to move at all, must be immune by its own movements. Robinson, however, sounds very clear on the matter, but it is the only such observation which the writer has been able to find on such predation. On none of the several trips made to Bush Key has the writer ever seen any evidence of it, nor has he seen any noticeable numbers of these crabs. True, they were not looked for particularly but it would seem that any marked concentration of them would not have been overlooked. As far as the 1945 season is concerned, the writer cannot recall having seen a single hermit crab, but in 1946 one was noted. They are very common on Garden Key, at Fort Jefferson, where their depredations militate against successful growing of flowers and vegetables in the little kitchen garden of headquarters. Little wire fences must surround the plants, else they are soon consumed. The common species of this crab there is *Cenobita diogones*, and it usually inhabits the shell of the West Indian top shell (*Livonia pica*).

Some of the young Sooties are lost by attacks of adult Sooties, while roaming about the key, once they can move around. Intrusion into the colony after the young have hatched always causes a dispersal of the young in all directions, and one can frequently see a youngster set upon, pecked and buffeted unmercifully. While some mortality in such a huge concentration is inevitable, it is by no means excessive and, indeed, one must reach the conclusion that it is rather light on the whole.

Weather is a factor of danger to the colonies, but in view of their location, not as serious as might be expected. Though, of course, the place is well in the hurricane belt, these fierce storms are not often experienced during egg time or even when most of the young are being reared. August sees the youngsters well along, and the terns usually leave the Tortugas soon after mid-September. These two months are the most dangerous hurricane periods. Occasional high tides sweep part of Bush Key but are not a serious menace. All things considered, the Tortugas are as free from a combination of the usual sources of danger as any locality of heavy nesting of which the writer knows. The very fact that the birds have used these islands for centuries is conclusive proof of their natural safety.

FEEDING DISTANCES

As might be expected in birds as active as the Sooty Tern, their feeding territory is very extensive. They are capable of long sustained flight and are as nearly tireless as any creature can be.

The writer's observations have frequently revealed Sooties in some numbers as far east of the Tortugas as Rebecca Shoal, which lies 19 miles from Bush Key. On June 20, 1945, my notes state: "Sooty Terns feeding about 10 miles east of Rebecca, 28–30 miles from Tortugas." Again on June 21, 1946: "Several Sooties abeam of Rebecca Light; about 30 feeding over disturbance in the water, 3 to 4 miles east, smaller groups 2 miles further east." Finally, under same date: "One Sooty at Smith Shoal, 8 miles NW of Key West" (this would be about 60 miles from Bush Key).

Earle R. Greene in his 'Birds of the Lower Florida Keys,' states that he saw two Sooties off the Bay Keys in the Great White Heron Refuge near Key West on June 26, 1941, and that "These were probably wanderers from the Tortugas colony." Of that, there is no possible doubt.

The writer has no data on feeding ranges west of the Tortugas, or north and south, but there is no reason to believe that distances in those directions are not as great as the easterly wanderings. Doubtless they are. The Noddy apparently does not range as far as the Sooty and generally one is within only a few miles of the Tortugas before any are noted. This doubtless has its exceptions.

Anyone who has studied the Sooty Terns cannot fail to be impressed with the vitality and unceasing energy displayed by them. Even when not feeding they indulge in soaring high over Fort Jefferson, where they can be watched in the late afternoon from the parade-ground or the top of the Fort, mingling with the Man-o'-war-birds in the air. As Watson well puts it: "It is the most restless and noisy bird I know, and almost as much so at night as during the day . . . How the bird maintains its vigor with no more continuous rest than it takes is a mystery. This peculiarity of the sooty has led to the popular nickname of 'wide-awake tern'." This is certainly most true. All through the summer, the clamor of the colony is easily heard at headquarters house at the Fort, night and day, and is as much a part of the place as the breaking of the surf on the beach of an ocean resort.

THE FUTURE

All things considered, one would assume that the future of the Tortugas colonies would be about as certainly safe as that of great

bird rookeries could be. This is true regarding hereditary return to the area, as the years have shown, and nothing is likely to change that, but certain topographic conditions on Bush Key at present give one to think. As has been stated, the Sooty Tern nests either on perfectly open sand or in very short vegetation about two or three inches high. The plant which is now very prevalent there and which is being used in such heights this season is the glasswort (*Salicornia*). It offers no drawback at such stage of growth but when it becomes higher the terns do not use it, as difficulties are encountered in depositing the egg. It grows rapidly and is doing so on Bush Key at the moment.

The comparisons between the 1945 and 1946 seasons' counts show only a slight decrease in the nesting Sooties, not enough to worry about. However, it may be that next season will witness a very sharp drop—this because of the ever increasing spread of the above-mentioned plant. The writer was nothing short of amazed this season at the way it had increased and covered wide areas which, a year before, had been bare sand. A similar condition exists with the sea-lavender (*Tournefortia*), though not quite to such a marked degree.

Thousands of Sooties were using the short *Salicornia* this season (1946). If similar increase in growth continues, and there is no reason why it should not, next year will exhibit growth much too high for the terns to use. This is already the case in many hundred of square yards. Some sand areas will be present, of course, but the amount of this season's yardage will be greatly cut down by next. Where will the Sooties go?

As far as the writer knows, only one experiment in preparing ground artificially for the birds has been attempted, and that was a complete failure. After one of the seasons when the Sooties nested on Garden Key, it was noted that the vegetation increased there, and before the next season it was cleared off. Not a bird returned to it! Nor have any since. Would a similar attempt at clearing on Bush Key result in a similar desertion?

There is an impression current among some that the vegetation in an area used by these terns will become "burned up" by an excess of fertilization, and that eventually, such an area will become quite bare. So far, the reverse has been true on Bush Key. The terns use it yearly, and the vegetation is increasing rapidly. Just what the end will be is problematical.

Only three islands of the Tortugas group have been used by the Sooty-Noddy combine as far as we know. These are Bird, Garden and Bush Keys, of which only the last two now remain. There are

(*Top*) WARNING SIGN ON BUSH KEY, JUNE, 1945. NODDIES ON TOP OF SIGN. (*Middle*) SAME IN JUNE, 1946, SHOWING GREAT INCREASE OF VEGETATION (SEA LAVENDER, *Tournefortia*) IN ONE YEAR. (*Bottom*) INCUBATING SOOTY TERN.

two others which now offer suitable Sooty nesting ground—East and Hospital Keys. East Key is about four and a half miles from Bush Key to the eastward. Sea-oats (*Uniola*) and sea-lavender (*Tournefortia*) and some bay cedar (*Suriana*) are the principal growths, and there is a great deal of the goat's-foot vine (*Ipomea pes-capra*) running along the beach. It comprises some 85,000 square yards.

Hospital (Sand) Key is slightly northeast of Bush Key, distant about two miles. Though small, it seems to be constant, as a hospital was once built there in 1870 to serve Fort Jefferson, the brick foundations of which are still visible in part though very close to, and in, the water. The writer examined this key in 1946 and found not a single shred of vegetation on it. A more completely desolate spot would be hard to imagine, but it is typical Sooty nest area. It may be that this spot will yet be host to the terns.

The Noddy of course, is not affected by the bush growth except advantageously, as increase of bushes affords additional nest sites. At any rate, the season of 1947 seems to point to inevitable changes of some sort and is awaited with great interest.

ADDENDA

Since the above discussion was written and accepted by The Auk, the writer has accomplished the 1947 population survey at the Dry Tortugas. A brief résumé of it will be of interest here, as a follow-up.

As indicated above, the writer was under the strong impression that some shift would take place among the Tortugas terns in 1947, mainly because of the greatly increased spread of vegetation on Bush Key where they have bred for years. This impression—indeed, almost a conviction—was sustained. For the first time since 1940, the Sooty and Noddy Terns nested on Garden Key (Fort Jefferson) as well as Bush Key. There were more nesting birds on the former than the latter!

Again using the square-yard unit in estimating the population, the following results were obtained:

Bush Key—Square yards utilized, about 7000
Nesting density varied from 1 to 6 nests per sq. yd.
Total number of Sooties, 30,112

Garden Key—Square yards utilized, about 10,000
Nesting density varied from 2 to 7 nests per sq. yd.
Total number of Sooties, 34,158

Total number of Sooties in 1947, 64,270

The rather wide discrepancy between the population figures of this season and last may be accounted for as follows:

1. Fewer birds arrived this year for nesting. All personnel at Fort Jefferson were agreed on this point.
2. The hatch had progressed much further at the time of the writer's visit this year, thus making it much more difficult to estimate, or measure nesting densities, as the young were roaming about in large numbers.
3. The prevalence of vegetation on both keys made it more difficult to see eggs and young. Many of both were *under* bushes, tall grass and branching plants.

NODDY TERN.—This species showed a decrease in 1947. Actual nest count was made on both Garden and Bush Keys, as this species was also using both keys. The results were as follows: Nests on Bush Key, ninety-two; on Garden Key, nine. Allowing a 10 % omission error, a total of 112 nests would be reasonably accurate. Also allowing for non-breeders or unmated birds, if any, the total Noddy population would not have exceeded 250.

ROSEATE TERN.—This species, completely lacking in 1946, again appeared at the Tortugas this year. Three keys were utilized by them as follows:

Bush Key (the usual location on the sand-spit at east end)	54 nests
Long Key	67 nests
Hospital (*Sand*) *Key*	21 nests
Total	142

Total Roseate Tern population—284 birds

Man-o'-war-bird predation in 1947 was found to be serious. Far more so than in any of the past three seasons in which the writer has worked. Numerous instances were noted of young Sooty chicks being seized and swallowed. The particular times of day this occurred were early morning and late afternoon. The 1947 Man-o'-war-bird population was about one hundred individuals, with a preponderance of females and immatures.

Predation by both sand crab (*Ocypoda arenaria*) and hermit crab (*Cenobita diogones*) was found to be at a minimum. No evidence of rat damage was seen at all.

One Smooth-billed Ani (*Crotophaga ani*) was seen on Bush Key. Search was made for the possible nest, though but one bird was seen

at a time. This was unavailing. The only other land bird observed was a Barn Swallow (*Hirundo rustica erythrogaster*) on Bush Key, June 22.

Dates of the 1947 survey were June 20 through June 26, 1947.

Vegetation on Bush Key continues to spread, and practicaliy the whole island is now clothed to high-water mark, with one or two small sand areas still existing. Should no hurricane occur this season there is no reason to believe that there will be any cessation of this growth, and with Garden Key nesting sites rather fully occupied, it remains to be seen what the season of 1948 will present!

The Crescent
Charleston 50
South Carolina

THE SEASONS OF BIRD SONG—THE CESSATION OF SONG AFTER THE NESTING SEASON

BY ARETAS A. SAUNDERS

It is well-known that when the breeding cycles of birds are over, usually from middle to late summer, song gradually ceases. But only a few detailed studies of this phenomenon have been made and published, and there is much still to learn. The first of these studies in America, to my knowledge, is that of Bicknell (1884–1885). Since then the chief publications on this subject that have come to my attention are those of Fry (1916), Baerg (1930), Vaurie (1946) and my own (1926 and 1938). Some of these studies have been for a single season only, but the authors have recognized the desirability of making such studies over a period of years in a single locality.

The time of cessation for each species, and the manner in which it takes place, varies from year to year, evidently according to weather conditions. Just which conditions are the important ones is something still to be solved. The direct cause of cessation seems to be the approach of the postnuptial molt, and since the time of cessation varies with the years it is probable that the time of molt does also. This leads to the conclusion that the weather conditions that cause the difference are more deep-seated than the change from warm to cool, or fair to rain, from day to day. These local changes often affect the amount of singing from one day to another, but they cannot cause the change in the birds' physical condition that comes with the postnuptial molt and causes complete cessation of song.

More studies of this subject, from various different localities, and covering a period of years, are highly desirable. There is not only

variation in localities that differ in latitude and altitude, but also differences in the extent to which these factors affect different species. For example, my studies show that in Allegany State Park, Cattaraugus County, New York, the Towhee and the Yellow-throat cease singing at very nearly the same time. In Fairfield County, Connecticut, however, the Towhee definitely sings later than the Yellow-throat. Studies over a period of years show that there is often a difference of two weeks to almost a month in the earliest and latest dates that songs cease, for each species.

The study of cessation in the field is not always easy, but it can furnish, to an ambitious field ornithologist, a special interest for that season of the year that lies between the nesting season and the fall migration. In the study one must keep alert to bird songs of all kinds and keep daily records of the songs heard, and the numbers of each species heard singing. If this is not done, and begun some time before true cessation occurs, one is likely to discover that a certain bird that was singing abundantly a week or two ago, is now singing very little or not at all. When did the song stop or begin to decline? Unless daily records are kept the observer cannot be sure.

In Vaurie's paper (1946) an excellent method of making such studies is explained—that of going over the same route each day, at the same time of day. I have not tried this, but having lived, both in the Allegany Park and in my present home, in localities where many bird songs can be heard in the height of the season, I have been able to make daily comparisons of the same individual birds. One may come to know an individual bird by the location of its singing tree, and often, if one listens to the song carefully, by some peculiar individual character in song (Saunders, 1924).

One must be careful not to confuse cessation, due to the approach of the molt, with a temporary cessation or decline due to the condition of the nesting cycle. Certain species cease singing during certain parts of the nesting cycle, and then resume singing when that part is over. Early in May one may notice a decline in the singing of Field Sparrows, due to the fact that mated males cease to sing (Walkinshaw, 1945: 12). Catbirds and Thrashers usually cease singing during the period of incubation, whereas Song Sparrows cease when they acquire a mate and begin again when incubation starts (Nice, 1943: 172–174). We know comparatively little about this for most species; a good many writers on nesting habits do not mention whether the birds sang or not. I am inclined to believe that all or a majority of tree-nesting species sing throughout the nesting cycle, but nesters on the ground, in low bushes and in holes, cease singing for a part of the time.

The decline of song when the molt is approaching is usually gradual both in individuals and in the species. A mere recording of the last date on which a song is heard is not sufficient. In fact, such dates are inclined to be misleading. For example, in this last summer, 1946, the last Scarlet Tanager that I heard sang on August 9. But for several days before that I had heard no Tanager song. In fact, my notes show that there was a noticeable beginning of cessation as early as July 17, that by July 27 the majority of birds had ceased singing, and that after that date I heard only one bird in any one day, with several days intervening in which I heard none. This same sort of thing is generally true of all species, so that I find it of value to record, for each species, three different dates: (1) when the first decline of song is noted; (2) when the species, as a whole, has ceased singing; and (3) when the last individual song is heard.

Fry (1916) shows an excellent method of diagramming the results. Such diagrams could be used for any one species in a single year, or for the average results over a period of years. Such data, however, cannot be obtained for every breeding species in a region, but only for those that are common and widely distributed. For rarer species, or those that occur locally, only the last dates of singing can be definitely recorded. For that reason I have recorded my results, for each of the two regions where I have obtained data, in two tables: one giving complete results for the commoner species, and the other the last song only.

Another point that we must consider in the study of cessation is the fact that certain species revive the song when the molt is over. The subject of revival is a different matter that I intend to deal with in another paper. But there are certain species, such as the Baltimore Oriole, the vireos, and several of the warblers, where revival follows so soon after cessation that it is difficult to determine whether a particular song is the last one before cessation or the beginning of revival. Probably every individual of such a species ceases singing for a definite period during the molt. But different individuals do so at different times, so that there is little or no time through the summer that the species is altogether silent.

In my own studies of cessation I am unable to present data for as long a period of years as in the study of spring singing. Though my residence has been in Connecticut for many years, there was a period from 1921 to 1940 when I did not spend a single summer there. Until the summer of 1927 the localities were more or less scattered from year to year while I was engaged in research work for the Roosevelt Wildlife Station. From 1927 on, I was located at the Allegany School of

Natural History, and was able to make studies of cessation there for a period of fourteen years. Since 1940 I have completed six years' study of the subject in Connecticut.

In the Allegany Park I was able to make fairly complete studies for the species that breed in the forested hills, where the Allegany School was located. Other species were common in the open fields and valleys, but I was unable to visit these places frequently enough to obtain complete data. In Connecticut I was able to study both birds of wooded areas and of the open.

I have data for 64 species as shown in the following tables. I have omitted subspecies. They have no particular significance in this study. Anyone who insists upon them may determine them from geographical ranges as readily as I. At the rate at which new subspecies are now being described, many names I might use are likely to be changed in a few years.

The tables, for cessation of the different species in each of the two regions, follow. In those tables where only dates of last songs are given, the species are not all uncommon, but the non-passerine species and the Nuthatch and Chickadee are erratic in singing habits, so that it is difficult or impossible to determine other dates than those of last songs. In the Allegany Park table I included some dates recorded in the years 1921 and 1922, when I was in the region, but before the Allegany School was started, and before I made records of anything but the last songs heard. The dates for these years have been previously published (Saunders, 1926: 486–491).

In addition to the above, the Long-billed Marsh Wren sang until August 2, 1942, and August 12, 1946, but its singing was not observed in other years. The Sharp-tailed Sparrow, a bird that, though common in the proper localities, sings very little, was heard on August 9, 1941.

The Black-billed Cuckoo was heard in seven years because in 1940 I returned to Connecticut earlier than usual, and the bird did some very late singing that year.

The singing of cuckoos, from year to year, is exceedingly erratic. Some details of this have been previously published (Saunders, 1938: 43–45).

As far as possible I have checked the dates of singing and cessation with the seasons of molt as reported by Dwight (1900). He does not give the time of postnuptial molt in all species but with most of those where he does the dates check well. In the case of the Mourning Warbler my data would indicate that the molt should begin in mid-July, rather than in August.

CESSATION OF SONG IN ALLEGANY STATE PARK, CATTARAUGUS CO., N. Y.
1927–1940, INCLUSIVE

	Beginning of cessation			*General cessation*			*Last individual song*		
Species	*Average*	*Earliest*	*Latest*	*Average*	*Earliest*	*Latest*	*Average*	*Earliest*	*Latest*
PHOEBE	7– 9	7– 1–'33	7–19–'40	7–12	7– 3–'36	7–21–'27	7–17	7– 8–'33	7–31–'28
LEAST FLYCATCHER	7–11	7– 2–'38	7–18–'34	7–15	7– 7–'38	7–21–'35	7–18	7– 7–'38	7–29–'36
HOUSE WREN	7–21	7–11–'27	8– 4–'37	7–25	7–16–'30	8– 6–'37	8– 3	7–21–'27	8–17–'33
CATBIRD	7–15	7– 2–'29	7–26–'37	7–21	7– 5–'29	7–31–'37	7–25	7– 8–'29	8– 2–'37
ROBIN	8– 2	7–28–'38	8–15–'39	8– 6	7–29–'29	8–15–'39	8–11	7–25–'29	8–22–'37
HERMIT THRUSH	8– 4	7–27–'27	8–13–'35	8–10	7–31–'29	8–17–'39	8–14	7–31–'29	8–25–'31
BLUE-HEADED VIREO	8– 7	7–29–'29	8–15–'38	8–10	7–29–'29	8–23–'36	8–17	8– 1–'29	8–28–'35
RED-EYED VIREO	8– 7	7–19–'29	8–16–'36	8–13	7–26–'29	8–25–'38	8–17	8– 1–'29	8–27–'38
MAGNOLIA WARBLER	7–21	7–14–'33	8– 1–'37	7–23	7–20–'33	8– 4–'37	8– 2	7–26–'33	8–15–'37
BLACK-THROATED BLUE WARBLER	7–12	7– 6–'32	7–16–'37	7–14	7– 6–'32	7–21–'30	7–21	7–14–'27	8– 6–'31
BLACK-THROATED GREEN WARBLER	7–25	7–17–'29	8– 7–'27	7–29	7–18–'36	8–11–'37	8– 4	7–26–'36	8–19–'37
CHESTNUT-SIDED WARBLER	7–14	7– 9–'32	7–20–'35	7–16	7– 9–'32	7–23–'31	7–19	7–12–'29	7–30–'38
OVEN-BIRD	7–15	7– 5–'29	7–26–'37	7–18	7–12–'29	7–26–'37	7–21	7–12–'33	8– 4–'39
YELLOW-THROAT	7–25	7–20–'38	8– 1–'29	7–30	7–27–'35	8– 2–'37	8– 3	7–29–'39	8–13–'37
CANADA WARBLER	7–11	7– 7–'36	7–22–'37	7–14	7–10–'30	7–28–'37	7–18	7–11–'29	7–31–'37
REDSTART	7– 7	7– 2–'30	7–12–'40	7–11	7– 4–'38	7–15–'35	7–16	7– 7–'29	7–27–'36
SCARLET TANAGER	7–18	7– 8–'29	7–25–'37	7–24	7–12–'29	8– 1–'37	7–28	7–14–'36	8–10–'37
ROSE-BREASTED GROSBEAK	7–10	7– 1–'29	7–16–'37	7–14	7– 1–'29	7–19–'35	7–19	7–12–'30	8– 3–'37
INDIGO BUNTING	7–24	7–14–'32	7–31–'37	7–31	7–19–'34	8– 7–'31	8– 8	7–26–'34	8–21–'39
GOLDFINCH	7–30	7–14–'27	8– 6–'30	8– 6	7–19–'34	8–18–'35	8–15	8– 2–'34	8–28–'35
TOWHEE	7–23	7–13–'36	7–31–'33	7–29	7–20–'29	8– 3–'33	8– 5	7–30–'31	8–13–'37
SLATE-COLORED JUNCO	7–27	7–18–'29	8– 4–'37	8– 2	7–23–'29	8–13–'37	8– 7	7–26–'31	8–20–'37
CHIPPING SPARROW	7–24	7–17–'32	8– 1–'28	7–29	7–24–'32	8– 4–'35	8– 4	7–28–'27	8–10–'38
FIELD SPARROW	7–24	7–21–'32	8– 3–'28	8– 3	7–27–'33	8–11–'38	8–12	8– 2–'34	8–16–'37
SONG SPARROW	8– 9	8– 3–'37	8–16–'28	8–14	8– 9–'29	8–25–'31	8–18	8– 9–'29	8–25–'31

CESSATION OF SONG IN FAIRFIELD COUNTY, CONNECTICUT
1941–1946 INCLUSIVE

Species	*Beginning of cessation*			*General cessation*			*Last individual song*		
	Average	*Earliest*	*Latest*	*Average*	*Earliest*	*Latest*	*Average*	*Earliest*	*Latest*
CRESTED FLYCATCHER	7–21	7–13–'46	7–27–'45	7–24	7–17–'46	8– 1–'45	7–31	7–17–'46	8– 6–'42
PHOEBE	7– 8	7– 7–'44	7– 8–'45	7–15	7–12–'46	7–18–'44	7–31	7–20–'43	8–13–'44
LEAST FLYCATCHER	7– 7	7– 1–'46	7–16–'41	7–13	7– 9–'46	7–19–'42	7–19	7–11–'46	7–30–'42
HOUSE WREN	7–31	7–24–'44	8– 7–'42	8– 7	8– 3–'46	8–11–'41	8–14	8– 6–'43	8–21–'42
CATBIRD	7–23	7–20–'43	7–26–'42	7–27	7–23–'44	7–31–'43	8– 5	7–29–'44	8– 9–'41
BROWN THRASHER	6–22	6–17–'45	6–25–'44	6–30	6–26–'45	7– 7–'41	7– 8	7– 3–'45	7–16–'41
ROBIN	7–26	7–18–'44	7–30–'41	8– 4	7–30–'43	8– 6–'45	8–14	8– 7–'42	8–23–'44
WOOD THRUSH	7–27	7–23–'44	8– 2–'43	7–31	7–27–'44	8– 5–'43	8– 5	7–30–'44	8–16–'46
VEERY	7– 7	6–29–'46	7–14–'41	7–14	7–11–'45	7–18–'41	7–16	7–11–'45	7–22–'43
WHITE-EYED VIREO	8– 4	8– 2–'42	8– 7–'44	8– 8	8– 3–'46	8–12–'44	8–11	8– 4–'42	8–17–'44
YELLOW-THROATED VIREO	8– 1	7–25–'46	8–12–'41	8– 7	7–29–'46	8–12–'41	8–13	8– 6–'46	8–23–'41
RED-EYED VIREO	8– 7	7–29–'46	8–12–'44	8–11	8– 8–'46	8–17–'42	8–15	8– 9–'45	8–19–'44
WARBLING VIREO	8– 5	8– 3–'41	8– 8–'44	8– 8	8– 5–'43	8–12–'44	8–14	8– 6–'41	8–19–'42
BLACK AND WHITE WARBLER	7– 7	7– 2–'46	7–12–'43	7–12	7– 4–'46	7–19–'42	7–17	7–13–'44	7–22–'43
BLUE-WINGED WARBLER	6–21	6–11–'46	7– 1–'44	6–28	6–25–'45	7– 7–'44	7– 6	6–28–'41	7–11–'44
YELLOW WARBLER	7–12	7– 6–'46	7–20–'41	7–16	7–10–'46	7–27–'43	7–20	7–13–'46	7–30–'43
CHESTNUT-SIDED WARBLER	7–12	7– 7–'45	7–15–'42	7–17	7–11–'45	7–20–'43	7–21	7–15–'45	7–24–'43
OVEN-BIRD	7– 9	7– 6–'44	7–14–'41	7–16	7– 8–'44	7–22–'43	7–20	7–13–'44	7–28–'43
YELLOW-THROAT	7–21	7–17–'44	7–25–'43	7–26	7–19–'44	8– 3–'45	8– 2	7–23–'44	8–14–'45
YELLOW-BREASTED CHAT	7–13	7– 7–'44	7–18–'41	7–19	7–11–'44	7–26–'41	7–25	7–11–'44	8– 9–'46
REDSTART	7– 5	7– 1–'46	7–11–'41	7– 8	7– 2–'44	7–15–'43	7–20	7– 7–'45	7–30–'43
BOBOLINK	6–29	6–24–'43	7– 3–'45	7– 4	7– 2–'43	7– 8–'42	7– 9	7– 2–'43	7–18–'42
MEADOWLARK	7–29	7–14–'45	8– 9–'43	8– 4	7–21–'45	8–20–'43	8–12	8– 2–'45	8–25–'43
RED-WING	7–12	7– 7–'45	7–25–'43	7–20	7–14–'45	7–25–'43	7–26	7–21–'45	7–31–'43
BALTIMORE ORIOLE	7– 1	6–28–'46	7– 3–'42	7– 6	6–29–'46	7– 7–'45	7–13	7– 3–'46	7–20–'42
SCARLET TANAGER	7–22	7–17–'46	7–26–'42	7–28	7–23–'43	7–31–'41	8– 2	7–25–'44	8–10–'41
ROSE-BREASTED GROSBEAK	7– 6	7– 4–'45	7– 8–'44	7–13	7– 7–'45	7–21–'44	7–21	7–14–'42	7–25–'43
INDIGO BUNTING	8– 1	8–27–'43	8– 5–'41	8– 5	7–30–'43	8–10–'44	8–13	8– 8–'43	8–19–'44
GOLDFINCH	8– 9	8– 3–'43	8–17–'41	8–18	8–10–'46	8–24–'41	8–26	8–18–'43	8–31–'42
TOWHEE	8– 5	8– 3–'45	8–17–'41	8–10	8– 6–'46	8–16–'41	8–13	8– 7–'43	8–18–'41
CHIPPING SPARROW	7–21	7–15–'46	7–26–'42	7–27	7–20–'46	8– 1–'42	8– 4	7–29–'44	8– 9–'46
FIELD SPARROW	8– 4	7–27–'46	8– 8–'43	8–14	8– 5–'46	8–21–'42	8–23	8–18–'46	8–28–'42
SONG SPARROW	8–12	8– 6–'46	8–15–'42	8–18	8–13–'41	8–22–'42	8–28	8–26–'46	8–31–'41

DATES OF LAST SONGS IN ALLEGANY STATE PARK, AND VICINITY
NEW YORK, 1921–1922 AND 1927–1940 INCLUSIVE

Species	*Number of years observed*	*Average*	*Earliest*	*Latest*
YELLOW-BILLED CUCKOO	11	7–22	7– 7–'36	8– 6–'21
BLACK-BILLED CUCKOO	14	8– 6	7–15–'36	8–29–'32
WHIP-POOR-WILL	5	8– 1	7–21–'21	8– 9–'29
FLICKER	15	7–26	7– 5–'29	8–10–'37
ALDER FLYCATCHER	4	7–21	7–17–'29	7–27–'38
BLACK-CAPPED CHICKADEE	15	8–10	7–29–'36	8–16–'32
WINTER WREN	8	7–24	7–12–'34	8–16–'28
WOOD THRUSH	15	7–26	7–16–'36	8– 8–'33
OLIVE-BACKED THRUSH	14	7–30	7–12–'29	8– 8–'28
VEERY	14	7–12	7– 3–'34	7–23–'37
BLACK AND WHITE WARBLER	12	7–11	7– 7–'40	7–21–'37
NASHVILLE WARBLER	5	7–13	7– 6–'31	7–27–'39
YELLOW WARBLER	13	7–20	7– 8–'29	7–27–'21
BLACKBURNIAN WARBLER	14	7–12	7– 4–'29	7–23–'21
MOURNING WARBLER	15	7–16	7– 7–'32	7–29–'27
HOODED WARBLER	12	7–17	7– 8–'30	7–31–'29
MEADOWLARK	13	7–29	7–17–'36	8– 9–'40
RED-WING	7	7–22	7–18–'29	7–29–'40
PURPLE FINCH	13	7–12	7– 1–'27	7–26–'35
SAVANNAH SPARROW	14	7–29	7–18–'38	8–15–'35
VESPER SPARROW	15	7–31	7–17–'30	8– 9–'29
SWAMP SPARROW	9	8–14	8– 5–'40	8–29–'31

DATES OF LAST SONGS IN FAIRFIELD CO., CONNECTICUT
1941–1946 INCLUSIVE

Species	*Number of years observed*	*Average*	*Earliest*	*Latest*
MOURNING DOVE	3	8– 9	7–20–'41	8–21–'43
YELLOW-BILLED CUCKOO	6	8– 5	7–10–'44	8–22–'43
BLACK-BILLED CUCKOO	7	8–10	7–12–'44	8–24–'40
FLICKER	6	8–24	8–10–'46	8–30–'44
BLACK-CAPPED CHICKADEE	6	8–11	8– 2–'42	8–15–'46
WHITE-BREASTED NUTHATCH	6	7–25	7–13–'44	8–11–'41
BLUEBIRD	6	8–16	8– 4–'42	8–27–'46
PRAIRIE WARBLER	5	7–13	7– 3–'46	7–24–'43
LOUISIANA WATER-THRUSH	6	6–18	6–11–'46	6–23–'43
ORCHARD ORIOLE	6	7–12	7– 3–'44	7–17–'41
PURPLE FINCH	6	7–22	7–12–'42	7–31–'43
HENSLOW'S SPARROW	4	8–10	8– 2–'42	8–20–'41
SEASIDE SPARROW	6	7–31	7–22–'45	8–22–'44
VESPER SPARROW	6	7–22	7–14–'45	8– 8–'41

In the case of the Black-capped Chickadee there seems to be a peculiar condition. In most years the birds sing commonly in early August, and often late July when they should be molting. Cessation seems to come mainly in the third week of August, but song is often resumed late in that month.

There are numbers of interesting things to be noted in the study of cessation. Birds that have ceased to sing through the greater part of the day may continue to do so in early morning or in the evening.

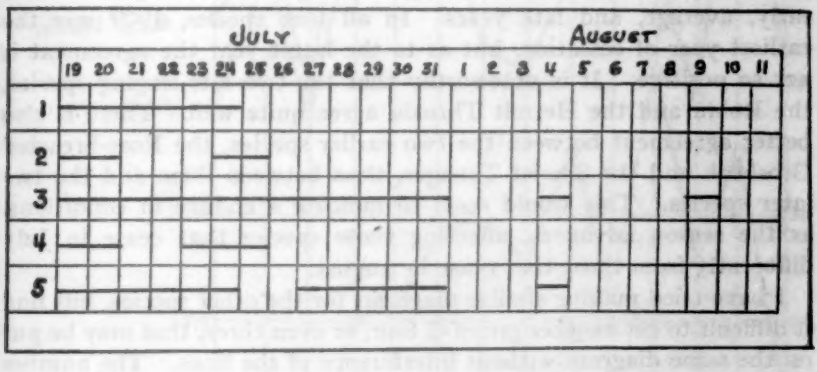
After the song has actually ceased a bird may call for a few days at that time of early morning or of evening when it formerly sang. For example, the Towhee calls *chewink* and the Tanager, *chip-churr*. A bird that has a flight song that is different from the common type, such as the Oven-bird, Yellow-throat and Mourning Warbler, may suddenly sing that song days or even weeks after the regular song has subsided.

Different individuals of the same species cease singing at different times. I made some notes on this matter this past summer (1946) that gave interesting and rather surprising results. The observations were made on the Wood Thrush, about the commonest and most conspicuous breeding bird in the vicinity of my present home. Until this past summer some particular bird has occupied a territory that included the woods directly back of the house. I have made records of the songs from year to year, and have known individual males by their peculiarities of song. Other Wood Thrushes could always be heard also, but they were farther away.

But in 1946 a peculiar condition occurred. Apparently my property was not one territory but a corner where several territories met. Five different male Wood Thrushes sang regularly close to the house—usually, except in the evening, only one or two at a time. Each individual had one or more unusual phrases in its song so that, though I made records of all the phrases of each one, that phrase alone was sufficient to identify the individual. I believe that all individual male Wood Thrushes can be recognized by their combination of phrases, even when no one phrase is unusual (Saunders, 1924).

I numbered the individuals from 1 to 5. No. 1 had a high-pitched phrase that sounded like *wheeo*. It was so different that I did not, at first, recognize it as a Wood Thrush. No. 2 had a five-note phrase, the first note high-pitched, and each succeeding note lower—a most unusual arrangement in a Wood Thrush. The whole phrase dropped more than an octave in pitch and sounded like *eeelaylaloloo*—the first and last notes long, and the three in the middle short. No. 3 had a phrase like *wayeetroo* that dropped an exact octave in the second and third notes. No. 4 was an old friend—the bird that had occupied the main territory in 1944 and 1945—and I checked my record of its phrases with records made in previous years. Its distinctive phrase was a two-note one that sounded like *heeray*. No. 5 had a low-pitched, unmusical phrase that slurred first down and then up, like *awooaw*. It also had an extremely musical four-note phrase, *ahloleelay*, that helped to mark it, though the phrase is one I have recorded from other Wood Thrushes in past years, albeit not a common one. As a matter of fact, though the other phrases of these five birds were ordinary ones, no single phrase of any one was exactly like that of any other.

I began recording the singing of all five individuals daily in early July, before there was any sign of cessation. All five sang every day until July 20. On the 21st, Nos. 2 and 4 were not singing. No. 4 resumed singing on the 23rd and No. 2 on the 24th. Both sang last on the 25th. Nos. 1 and 5 ceased on the 24th, while No. 3 continued to sing. No. 5 resumed singing on the 27th and continued with 3 until the 31st. In the first three days of August not a single Wood Thrush was heard. The weather then was rather cool. Then, on the 4th, with warmer weather, Nos. 3 and 5 resumed singing. Then there were four days of silence, but in the early morning of August 9, No. 3 began singing again, and, to my astonishment, No. 1 sang alternately with him. I had not heard No. 1 for fifteen days! On the



TEXT-FIGURE 1.—Cessation of individual Wood Thrushes in 1946.

10th, No. 1 sang alone, just a few phrases in the early dawn, and then Wood Thrush song was over for the year.

The diagram of this (Text-fig. 1) shows that, most of the time, these birds began and ceased to sing in pairs. This may have been merely accident, but is it well-known that the singing of one individual often induces another to sing. Perhaps a bird that is about to cease, with the approach of molt, will sing a bit longer if another is singing, or start again if another bird starts. But if a bird finds itself singing alone, as was the case with No. 1 on the last day, it will sing very little.

It is, of course, possible that one or more birds sang certain days when I did not hear them. But most Wood Thrush singing, toward the end of the season, is in early morning or in the evening. I was usually awake at daylight, with my windows open toward the rear of the house. I habitually spent evenings on a screened porch at the rear of the house, listening particularly for each one of these thrushes.

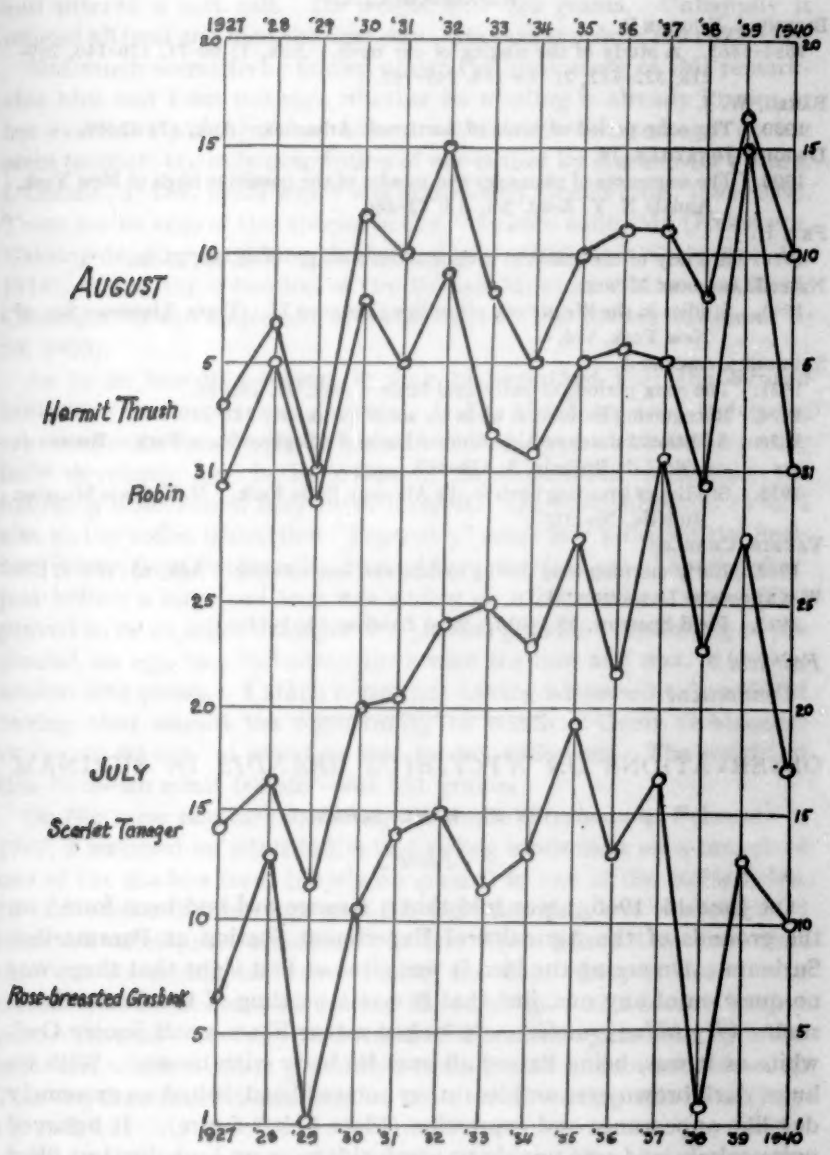
Just why No. 1, after more than two weeks silence, joined No. 3 in song on August 9, is a mystery. Why did he not, if molt was not too far advanced to sing, join in before, when 3 and 5 were singing? Is there some rule of Wood Thrush etiquette whereby two should accompany each other, but three is a crowd? Perhaps future observations of this sort, if I, or someone else, should have opportunity to make them, will throw more light on this subject, or prove it all a mere accident.

Comparisons of cessation in different seasons bring out points that should aid in determining just what it is that causes song to cease early in one year and continues late in another. The diagram (Text-fig. 2) of four species in the Allegany Park, illustrates this. The fairly close paralleling of the lines shows a general agreement of species as to early, average, and late years. In all four species, 1929 was the earliest year of cessation, but as to the latest year the agreement is not so positive. It is noteworthy that the two late-singing species, the Robin and the Hermit Thrush, agree quite well. There is also better agreement between the two earlier species, the Rose-breasted Grosbeak and the Scarlet Tanager, than between them and the two later species. This would seem to indicate a change in conditions, as the season advances, affecting those species that cease in July differently from those that cease in August.

I have tried making similar diagrams for the other species, but find it difficult to get another group of four, or even three, that may be put on the same diagram without interference of the lines. The number of species that cease very early, or very late, is few, whereas many species cease in late July or early August. I did not, however, find any other group of species that agree as perfectly as the four I have used as illustration.

Tabulating the data in the tables, there is evidence that 1929 was decidedly the year of earliest cessation. Eleven of the twenty-five species had their earliest dates of cessation in that year, and not more than five in any other year. In the same manner, 1937 was evidently the year of latest singing; nine species had their latest general cessation in that year, and five or less in any other year.

My Connecticut records cover too short a time to determine much of value, but the general trend of the figures shows that the first three years, 1941 to 1943, were ones of late singing, and the last three, 1944 to 1946, those of early cessation. The latest year appears to be 1941, and the earliest is, quite evidently, 1946.



TEXT-FIGURE 2.—General cessation of four species in Allegany State Park, N. Y., 1927–1945.

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Fairfield
Connecticut

OBSERVATIONS ON *NYCTIBIUS GRANDIS* IN SURINAM

BY FR. HAVERSCHMIDT

Plate 3

ON June 14, 1946, I was told that a strange owl had been found on the grounds of the Agricultural Experiment Station at Paramaribo, Surinam. On seeing the bird it was clear at first sight that there was no question of any owl, but that it was a nestling of the Great Goatsucker (*Nyctibius grandis*). It looked rather like a small Snowy Owl, white as it was, being barred all over its body with brown. With its huge, dark brown eyes and its rather pointed head, it had an extremely dog-like appearance and expression (Plate 3, left figure). It behaved quite calmly and was unable to perch sideways on branches but liked to sit in a rather upright posture at the end and at the sides of a log or on the ground. According to the finders it was found sitting on the ground. When approached too near or when about to be handled, it opened its huge mouth in a threatening attitude (Plate 3, right figure)

and uttered a soft call. Its weight was 220 grams. Unhappily it refused all food and died the next day. Its skin is now in my collection.

Not much seems to be known about the life history of this remarkable bird and I am not sure whether its nestling is already known or has ever been photographed before. Well-authenticated eggs do not seem to exist; the only description of one is that by Burmeister (Journ. f. Ornith., 1: 169, 1853) which was doubted by Goeldi (Ibis, 1896: 299). There are no eggs of this species in the Nehrkorn collection (Nehrkorn, Katalog der Eiersammlung, 2e Auflage: 127, 1910; and Nachträge: 12, 1914), nor in the collection of the British Museum (Oates and Reid, Catalogue of the collection of birds' eggs in the British Museum, 3: 56, 1903).

As to its breeding season, it may be remarked that the Penard brothers (De Vogels van Guyana, 2: 75, 1910) received a female, captured near Paramaribo at the end of February, which had a nearly fully developed egg in its oviduct. In connection with this, the following observation may be of interest. On November 24, 1946, I met at the coffee plantation "Peperpot," some few miles up the Surinam River, from Paramaribo, two soldiers who told me of having shot, just before, a large owl that was sitting on a branch in a tree. This proved to be an adult example of *Nyctibius grandis*. On falling to the ground, an egg, too, had come down with the bird and was, of course, broken into pieces. I much regret not having witnessed this incident having thus missed the opportunity to watch a Great Goatsucker sitting on its egg. I saved its skin for my collection. The weight of this bird—an adult female—was 581 grams.

On the same plantation, during the entire afternoon of February 2, 1947, I watched an adult individual sitting motionless on a branch of one of the shadow trees (*Erythrina glauca*) in one of the coffee fields. It had vanished from this spot the next morning but was observed there on subsequent occasions. It was April before I realized that this was its permanent roost during the day, where it dozed with closed eyes, motionless, on exactly the same spot on a branch in that particular tree. On May 10 I watched it scratching its head with one of its feet which it did in goatsucker fashion with its foot over its wing. This daytime roost it still uses at the time of writing this note (July 15, 1947).

On April 5 I found one of its hunting places. The bird was sitting on a pole of about 1½ meters height near the bank of the Surinam River. With the aid of a strong flashlight we could approach the bird which sat looking around calmly, with its huge, dark eyes that showed bright orange reflections in the beams of the flashlight. It did not fly

away before we actually touched the pole on which it was sitting. Unhappily all photographs taken on that occasion failed owing to a temporary defect in my camera. On April 12, it had moved to another place in a neighboring tree, where it was detected easily with the help of the flashlight, even at a great distance. Two bright orange spots in the darkness betrayed its position in a short time. On May 25, it had moved again, this time to the top of a royal palm where it could be watched better owing to the exposed position. From then on it could be found night after night on exactly the same spot which is still in use at the time of writing.

During the evening of May 30, I could, for the first time, study the bird's hunting methods, and it now became clear that *Nyctibius grandis* is a perch hunter and not a flying hunter. The bird sits on its exposed position, conning its neighborhood attentively, moving its head in all directions; then suddenly it flies away, often for rather a long distance, then turning with an elegant movement of its long tail, which acts as a rudder, it returns to its favorite lookout, often uttering a note on alighting that sounds like *oorrr*. I never could distinguish any prey, nor could I tell whether all its hunting trips were successful, whether it detected its prey at such a great distance, or whether it pursued its prey for some time before actually capturing it.

On June 13, at 6:50 in the evening, I saw it arrive at its usual lookout on the top of the royal palm. It came as noiselessly as an owl, with slow wing movements, its long tail acting as a rudder when it turned to alight. While sitting on its lookout it constantly moved its head in all directions, looking not only into the sky above it but also beneath it. Its activity was in great contrast to its motionless attitude when roosting during the day. In the ten minutes of the fast-falling darkness during which I was able to watch it, it made two hunting flights, each time immediately returning to its lookout. In neither case could I distinguish whether or not it had been successful.

During the night when it was impossible to make observations owing to the darkness, strange notes sounding like *oorrroo* from two birds were heard regularly.

According to my observations, it seems clear that this species has a definite roost where it remains dozing during the day and that it starts hunting from a lookout as soon as darkness has fallen.

14 Waterkant
Paramaribo
Surinam

NESTLING OF *Nyctibius grandis*. (*Right*) IN THREATENING ATTITUDE. PARAMARIBO, SURINAM, JUNE 14, 1946.

VARIATION IN THE SPRUCE GROUSE IN CANADA

BY. A. L. RAND

IN the material in the National Museum of Canada the female Spruce Grouse (*Canachites canadensis*) from northwestern Canada separate clearly from most of the rest of the series, while more than half of the females from the Maritime Provinces and Gaspé are indistinguishable from many southern Ontario birds. This accords so ill with the recent revision by Uttal (Auk, 56: 460–464, 1939) and with Friedmann's treatment (U. S. Nat. Mus., Bull. 50 [10]: 143–153, 1946) that further investigation seemed indicated. Through the kindness of Mr. L. L. Snyder I was able to borrow the splendid series from the Royal Ontario Museum of Zoology, some 184 specimens in all. Mr. Hoyes Lloyd lent eight specimens from his private collection. These with the specimens in the National Museum gave a total of some 309 specimens. Many of these are males or downy young in which little geographical variation is evident, or are otherwise unusable, leaving 134 females on which the following study is based for the most part. The race *C. c. atratus* Grinnell of the Alaska coast, said to be well characterized in both male and female, is not represented and is not discussed. The races *osgoodi* (not recognized by Uttal nor by Friedmann), *canadensis*, *canace*, and *torridus* (described by Uttal in 1939 and recognized by Friedmann) are well represented, and the large series permit an evaluation of the range of variation which is considerable, and of subspecific limits which do not agree with those set by Uttal and Friedmann.

VARIATION IN THE MALE

The adult males vary but little, and provide no characters sufficiently marked to use in diagnosing races in Canada, as Friedmann has pointed out and contrary to Uttal's findings. However, there is a slight geographical variation. Males from Wood Buffalo Park and northward and westward tend occasionally to have more distinct grayish white or whitish tips to the upper tail-coverts, and tend to be slightly more grayish. However, a male from Didsbury, Little Red Deer River, Alberta, and another from about 40 miles northwest of Entrance, Alberta, still have the upper tail-coverts and rectrices typical of *C. canadensis* with no approach to the condition in *C. franklinii*. However, the Didsbury specimen is somewhat more brownish olive in general color—more like many male *franklinii* than like the other *canadensis* in our series. These specimens from localities

approaching the range of *franklinii* but showing no approach to it in tail characters indicate that the zone of hybridization is narrow.

As the males do not show diagnostic features, there is no point in listing the specimens in detail. The material examined is as follows:

Nova Scotia, 8; New Brunswick, 8; Gaspé, 11; rest of Quebec, 21; Ontario, 47; Manitoba, 8; Saskatchewan, 3; Alberta, 4; Wood Buffalo Park, 15; northern British Columbia, 1; Northwest Territories, 6; Yukon, 11; Total, 143.

Variation in the Female

In view of the pronounced individual variation in the females, evaluation of the trends in geographical variation must be on a quantitative basis. Uttal had 58 females of the forms here treated, but did not discuss individual variation. Friedmann considered the females to have two color phases, one rufous, the other gray. However, the present material indicates that while some birds are very gray and others very rufous, many are intermediate. It seems better to consider the variation as individual. This is well illustrated by the tabular presentation of types of plumages arranged geographically as given beyond.

Friedmann compared corresponding color phases, and found that the rufous phase of *canace* was not distinguishable with certainty from the rufous phase of *canadensis;* and the gray phase of *torridus* only slightly different from the corresponding phase in *canace.*

If the proportion of sharply differentiated color phases was constant throughout the range of a species, the comparison of one type of plumage with its corresponding type, only, might be sufficient. But when the types of plumage are not clearly separable into two color phases, and when there is pronounced geographical variation in the proportion of the types occurring, it is necessary to compare the average of one population with the average of the next. The difference in proportion of types of plumage in various populations is one expression of geographical variation. Indeed it might be said that many subspecies are thus separable.

After some trial and error it was found advisable to admit nine different types of plumage. (Because wear made certain specimens of doubtful allocation, two more were added for worn specimens.) Each specimen was allocated to its category, irrespective of its geographical origin, on its average characters, using chiefly the amount and intensity of brown or gray in the plumage, the intensity and abundance, or the reverse, of the tawny markings in the upper parts, the extent and intensity of the rusty wash below, and to a lesser extent

the width of the gray edgings above and of the white edgings below. Wear must be considered; not only does it reduce gray and white feather edgings, but also on the upper parts it may expose concealed tawny markings.

Each group (except the single specimen in Group IX) intergrades with other groups and all represent continuous variation. Some characters vary independently of each other, so a strictly linear arrangement is perhaps not quite correct for all characters, but in general the series grades from the brownest (Group I) to the grayest (Group IX). The allocation of specimens is, of course, arbitrary, and another person would undoubtedly give different average values to the general effect produced by the many varying characters in some specimens. But it is doubtful if this would materially affect the whole picture.

Below is given the list of female Spruce Grouse, arranged into groups on average color characters regardless of geographical origin.

GROUP I.—Total, 4 specimens. The brownest specimens, browns and tawny intense and extensive.

Gaspé, 4: (Berry Mountain Road, 1; Federal Mine, 1; Ste. Anne River Portage, 2).

GROUP II.—Total, 8 specimens. Like I but browns less intense.

New Brunswick, 1: (near Bathurst).
Gaspé, 1: (Federal Mine).
Ontario, 6:(Petawawa, 1; Algonquin Park, 1; Muskoka area, 3; Parry Sound area, 1).

GROUP III.—Total, 7 specimens. Like II but rusty markings of dorsal plumage less conspicuous and more restricted; rusty wash below somewhat reduced.

Nova Scotia, 1: (Cape Breton Island).
Gaspé, 1: (Berry Mountain Road).
Ontario, 4: (Algonquin Park, 1; Temagami, 1; Parry Sound, 1; Sprague, 1).
Wood Buffalo Park, 1.

GROUP IV.—Total, 20 specimens. Like III but slightly duller brown.

Nova Scotia, 2: (Cape Breton Island).
Quebec, 6: (Bonne Esperance 5; Black River, Schyan Depot, Pontiac Co., 1).
Ontario, 11: (near Ottawa, 1; Ottawa Valley, 1; Hastings County, 1; Parry Sound area, 2; Lake Nipissing, 1; Lake Nipigon, 2; Lac Seul, 1, Favorable Lake, 2).
Franklin District, 1: (Charlton Island, James Bay).

GROUP V.—Total, 17 specimens. Like IV but browns duller and paler; grays more conspicuous, and rusty markings in dorsal plumage more plentiful and brighter, but not as much so as in Group II.

Nova Scotia, 2: (Lower Sackville, 1; Margaretsville, 1).
Gaspé, 2: (Table-top Mountain, 1; Ste. Anne River Portage, 1).

Ontario, 12: (Whitney, 1; North Bay, 2; Lake Nipissing, 1; Warren, 1; Timiskaming, 1; Muskoka area, 2; Parry Sound area, 1; Amyot, 1; Savanne, 1; Favorable Lake, 1).
Manitoba, 1; (Flin Flon area).

GROUP VI.—Total, 11 specimens. Like V but browns duller, and grays and blacks more conspicuous in dorsal plumage, white edgings more extensive below, with less rusty wash.

Ontario, 4: (Temagami, 1; Biscotasing, 1; Smoky Falls, Cochrane district, 1; near Armstrong, Thunder Bay district, 1).
Manitoba, 4: (Lake St. Martin, 1; Lake Andy, 1; The Pas, 1; Jack Head Indian Reserve, 1).
Saskatchewan, 2: (Montreal Lake, 1; Du Brocket Lake, 1).
Wood Buffalo Park, 1.

GROUP VI–VII.—Total, 17 specimens. Worn-plumaged birds that from their general appearance were probably similar to either Group VI or VII when in fresh plumage.

Quebec, 1: (Natashquan).
Ontario, 12: (Genier, 1; Moosonee, 1; Amyot, 3; Ingolf, 1; Lake Attawapiskat, 2; Favorable Lake, 4).
Wood Buffalo Park, 2.
British Columbia, 1: (Muncho Lake).
Yukon, 1: (Teslin Lake).

GROUP VII.—Total, 27 specimens. Like VI but with less tawny, and the browns grayer.

Quebec, 2: (Johan Beetz Bay, 1; Clova, Abitibi Co., 1).
Ontario, 8: (North Bay, 1; Timiskaming, 1; Franz, Algoma, 1; Nakina—Armstrong, 1; Lake Nipigon, 1; Larson, Thunder Bay district, 1; Favorable Lake, 2).
Manitoba, 5: (The Pas, 2; Lake St. Martin, 1; Duck Mountain, 1; Thicket Portage, 1).
Saskatchewan, 1: (Reindeer Lake).
Wood Buffalo Park, 11.

GROUP VII–VIII.—Total, 10 specimens. Worn specimens, which when fresh would probably resemble either Groups VII or VIII.

Quebec, 1: (Havre St. Pierre).
Ontario, 3; (Lake Attawapiskat, 1; Savanne, 1; Favorable Lake, 1).
Yukon, 6: (Sheldon Lake, 1; Nisutlin River, 1; Teslin Lake, 3; Kluane, 1).

GROUP VIII.—Total, 12 specimens. Like VII but browns and rusty still more reduced.

Manitoba, 3: (Vivian, 1; Winnipeg, 1; The Pas, 1).
Wood Buffalo Park, 3.
British Columbia, 2: (Gardiner Creek, 1; Wilson Creek, Atlin, 1).
Yukon, 3: (Rose River, 1; Lapie River, 2).
Alaska, 1: (Chitina River).

GROUP IX.—Total, 1 specimen. Like VIII but considerably grayer than the grayest in that group, with browns and tawny very much reduced.

Mackenzie district, 1: (Norman Wells).

TABLE SHOWING GEOGRAPHICAL DISTRIBUTION OF TYPES OF PLUMAGE IN ADULT FEMALES.

	I	II	III	IV	V	VI	VI–VII	VII	VII–VIII	VIII	IX
Nova Scotia			1	2	2						
New Brunswick		1									
Gaspé	4	1	1		2						
Quebec											
North shore, Gulf of St. Lawrence				5			1	1	1		
Pontiac Co.				1							
Abitibi Co.								1			
Ontario											
Southern, north to Temagami and Georgian Bay areas		6	4	6	8	1		1			
Northern and western				2	3	2	11	4	2		
Southwest, Nakina to Lac Seul and south				3	1	1	1	3	1		
James Bay				1							
Manitoba											
The Pas and north					1	2		3		1	
South of The Pas						2		2		2	
Saskatchewan						2		1			
Wood Buffalo Park			1			1	2	11		3	
British Columbia, north							1			2	
Mackenzie District											1
Yukon Territory							1		6	3	
Alaska										1	

In examining this table it is seen that the extremes are very different, but there is intergradation. Certain types of plumage predominate over considerable areas, and it is on this partial separation that subspecies must be recognized.

From Gaspé to Nova Scotia an intensely brown type of plumage occurs as follows: from southern Quebec and southern Ontario a deep brown type prevails; from northern Quebec to northern Alberta a paler brown type is commonest; and in the northwest, is a gray type. It is on these that the names *torridus, canace, canadensis* and *osgoodi* have been based. But the overlap between each of the groups is considerable, and it is necessary to examine each population for the amount of overlap. Using the convention of requiring 75% of the population (in this case the females in all types of plumage) to be separable before it is entitled to subspecific status, the following would be necessary:

	torridus	*canace*	*canadensis*	*osgoodi*
Total number of specimens	14	35	70	15
75% expected to be separable	10.5	26.2	52.5	11.2

Tabulating the above "races" to see how they compare in this respect gives the following:

GEOGRAPHICAL DISTRIBUTION OF PLUMAGE TYPES IN ADULT FEMALES, WITH 75% OF EACH "SUBSPECIES" COMPARED WITH NEXT FOR OVERLAP

Plumage type	I	II	III	IV	V	VI	VI–VII	VII	VII–VIII	VIII	XI
torridus 10.5 = 75%	4	2	2	2	4						
canace 26.2 = 75%		6	4	12	8	1	1	2	1		
canadensis 52.5 = 75%			1	6	5	10	14	25	3	6	
osgoodi 11.2 = 75%							2		6	6	1

From this table it is evident that 75% of the specimens of *canace* are separable from 75% of the specimens of *canadensis*. This is true even though northern and southwestern Ontario are areas of intergradation and this material is included. If part of it were excluded from the summary as being from an area of intergradation, the difference would be still more apparent.

With *torridus*, however, it is a different matter; 75% of the specimens from the supposed range of *torridus* are not separable from 75% of the specimens from the range of *canace*. This is due to a nearly similar range of individual variation in distant areas; our good series of southern Ontario birds shows that a rich red-brown plumage commonly occurs there also.

From the above table, *osgoodi* appears as a recognizable race. Though qualitatively the overlap with *canadensis* is great, quantitatively 75% of the individuals from the range of *osgoodi* are distinguishable from 75% of the individuals of *canadensis*.

VARIATION IN THE JUVENAL PLUMAGE

A Teslin Lake juvenal (*osgoodi*) falls within the range of variation of 12 juvenals from the range of *canadensis* from Ontario, and is not grayer as might be expected. It is much browner than any adult from the range of *osgoodi*.

VARIATION IN THE DOWNY YOUNG

We have the following downies:

osgoodi, Yukon, Kluane Lake, 1 specimen.
canadensis, 16 specimens:
  Saskatchewan, 1 (Reindeer Lake);
  Ontario, 15 (Amyot, 11; Lake Nipigon, 3; Favorable Lake, 1).
canace, 2 specimens:
  Ontario, 2 (Algonquin Park, 1; Lake Nipissing, 1).

The *canadensis* chicks are rather uniform except for one of the three Lake Nipigon birds which has only a faint yellowish tinge below, instead of being conspicuously yellow.

The Reindeer Lake, Sask. (*canadensis*) and the Kluane Lake (*osgoodi*) chicks, with many feathers showing, are slightly whiter only than most Ontario *canadensis*.

Of the two downy *canace*, one (Algonquin Park) is about like the yellowest *canadensis;* the other is considerably yellower.

SUBSPECIES RECOGNIZED

From the preceding it appears that the subspecies of the Spruce Grouse in Canada should stand as follows:

Canachites canadensis canace (Linnaeus).

From Nova Scotia and New Brunswick to southern Quebec (including Gaspé), east on the north shore of the Gulf of St. Lawrence to Bonne Esperance; north to Lake St. John (Uttal) and southern Ontario north to Temagami and Georgian Bay (Sprague) areas; overlaps the following subspecies through individual variation and tends to be more reddish brown in eastern Canada (Gaspé, especially).

Uttal had five females from the vicinity of Bonne Esperance (borrowed from the National Museum of Canada) that are definitely *canace* in appearance; however he had two females from Natashquan and Havre St. Pierre (also from the National Museum) that looked more like *canadensis*, and came from areas between Bonne Esperance and the type locality of *canace* (Quebec City). On the basis of the two *canadensis*-like specimens, he referred the seven to *canadensis*. It seems advisable to refer the seven to *canace* on the basis of the five specimens that look like *canace*, and extend its range to Bonne Esperance until additional quantitative data are received.

Uttal, who described *torridus* (here synonymized with *canace*), apparently had too few birds to show the range of variation of *canace*. Uttal also postulated differences between the males of *torridus* and *canace* that are not apparent in the present series.

Canachites canadensis canadensis (Linnaeus).

From Labrador and eastern Quebec, north to Chimo (Uttal), and south to Lance au Loup (Uttal) through northern and western Ontario to Alberta and southern Mackenzie (Wood Buffalo Park).

Differs from *canace* in the female sex by averaging more grayish brown, less reddish brown on the upper parts; with paler and less extensive tawny markings in the dorsal plumage and reduced tawny wash below; and with wider gray edgings above and white edgings below. Through individual variation it overlaps both the preceding (especially in Ontario) and the following races.

It is customary to consider *canace* as occurring in southwestern Ontario and in southern Manitoba. While birds resembling average *canace* occur north to James Bay, and to Lac Seul in western Ontario,

and birds approaching average *canace* are found still farther away, on the average of the populations, *canace* appears not to extend much westward of Georgian Bay.

Canachites canadensis osgoodi Bishop.

From central Mackenzie west through Yukon and south into northern British Columbia (to Gardiner Creek near Fort Nelson) and to the St. Elias Range (Chitina River), at least in Alaska.

Differs from *canadensis* in the female sex by being grayer, with less brown and less tawny in the plumage. There is considerable qualitative overlap with *canadensis* through individual variation, but this form is separable on a quantitative basis.

The additional, fresh-plumaged specimens, especially from Yukon in the Canadian National Museum, make the recognition of this race necessary, despite the fact that both Uttal and Friedmann did not recognize it. It must be noted that Wood Buffalo Park birds are not *osgoodi*. The males of both *osgoodi* and western *canadensis* show a slight paling and a tendency toward more distinct pale tips on the upper tail-coverts.

Note on Identifying Single Specimens

The variability in the Spruce Grouse female is such that a single specimen may be far from the average for the population from which it comes (see preceding table). For instance, a Wood Buffalo Park specimen is more like average *canace* than it is like the rest of the Wood Buffalo Park specimens which are *canadensis*. These non-conforming specimens are just as much a part of the population from which they come as are those that have the characters of the subspecies well developed. Despite their resemblance to some other subspecies, they belong with the average of their own population. In practice this is sometimes forgotten. Uttal (*tom. cit.:* 462) referred a female Spruce Grouse from Table Top Mountain, Gaspé Co., Quebec, to *canace*, despite the fact that he had several females from Gaspé localities west of Table Top Mountain, including Ste. Anne River Portage (two females) only six miles to the west, that he referred to *torridus*. Such identifications are quite unjustified, resulting in a false evaluation of the range of variation of a population, and in erroneous delimiting of ranges.

The mapping of the ranges of Spruce Grouse must depend on the identifications of material adequate enough to show the range of variation.

Chicago Natural History Museum
Chicago
Illinois

NOTES ON BIRDS OF THE PHILIPPINES

BY KENTON C. LINT AND KEN STOTT, JR.

THE following notes were obtained during military assignment in the Philippines in 1945 and 1946, while the observers were on leave of absence from the San Diego Zoological Society. The Field Artillery Battalion to which Lint was attached was stationed for the longest periods on the islands of Leyte and Samar, and the majority of his observations were made in those areas.

The itinerary followed by the naval epidemiology unit of which Stott was a member included most of the larger islands of the archipelago. However, since the greater part of his Philippine sojourn was divided between the area around Guiuan, Samar, and the Zamboanga Peninsula on Mindanao, the majority of his notes were recorded in those two regions.

Reproduced here are only those notes which either supplement in some way or do not concur with material published previously.

The nomenclature followed is that of Delacour and Mayr (Birds of the Philippines, Macmillan, 1946).

ARDEIDAE. Herons

REEF HERON (*Demigretta sacra*).—Of the scores of Reef Herons observed along the coasts of southern Samar during the months of June, July and August, 1945, all belonged to the white phase with the exception of a pair of gray birds. Only one example of this species was encountered during three months on the Zamboanga Peninsula, Mindanao. It belonged to the gray phase and was seen feeding along the shore of the Sulu Sea near San Ramón on October 26, 1945.

CATTLE EGRET (*Bubulcus ibis coromandus*).—This attractive little heron was found to be abundant throughout the lowlands of the Zamboanga Peninsula where it frequented marshy areas and followed free-ranging herds of domesticated Indian buffaloes (*Bubalus bubalis*). A large nesting colony was discovered in a marsh forest near San Roque, Mindanao, on August 23, 1945. The nests were constructed in low spreading trees and were situated very close to one another.

RUFOUS NIGHT HERON (*Nycticorax caledonicus manillensis*).—These birds shared the San Roque (Mindanao) rookery with the preceding species. Nests of both species were situated in the same trees, and so near to each other that brooding birds could easily reach into adjoining nests to steal their neighbors' eggs and nestlings.

BLACK BITTERN (*Dupetor f. flavicollis*).—Although Delacour and Mayr ascribe nocturnal and secretive habits to this species, we encountered it regularly in the marshes and rice paddies east of Zamboanga, Mindanao. It was always to be observed singly but it did not appear to be particularly shy nor was it restricted to nocturnal activity. We often saw it and at all times of day as it stood on the exposed ridges between flooded rice paddy squares.

ANATIDAE. Ducks

SPOTTED WHISTLING DUCK (*Dendrocygna guttata*).—An individual of this species was observed in the brackish marsh east of the Zamboanga (Mindanao) airstrip on October 29, 1945. Although this species was not seen again, we found the Lesser Fulvous Whistling Duck (*Dendrocygna arcuata*) to be fairly common in the marshes about Zamboanga throughout the fall months.

ACCIPITRIDAE. Hawks

CRESTED LIZARD HAWK (*Aviceda jerdoni magnirostris*).—Although Delacour and Mayr describe this bird as "rare and shy," we saw three individuals in different areas on Mindanao during the month of October, 1945. The first of these was encountered in a second-growth forest near Pulig, another at the demarcation line between the Santa Maria marsh and the edge of the second-growth forest, and a third example in a bare tree within half a mile of the center of the city of Zamboanga.

MONKEY-EATING EAGLE (*Pithecophaga jefferyi*).—An individual of this magnificent raptor was observed on September 9, 1945. It flew directly over us as we were crossing the jungle-bordered Tumaga River about twelve miles inland from Zamboanga. We recognized the bird at once, having become previously well acquainted with the species through a living bird exhibited by the San Diego Zoological Society in 1938. Our guide, Pablo Santos, who had an excellent knowledge of the fauna of the area, reported that he had seen the species on numerous occasions as it flew over his home in the forest near the Pasonanca Waterworks which lie approximately a mile inside the opening of the Tumaga Canyon.

PIED HARRIER (*Circus melanoleucus*).—An individual of this strikingly marked hawk was seen near Burauen, Leyte, in August, 1945, and another in a rice paddy near Mahnican, Mindanao, in September, 1945.

MARSH HARRIER (*Circus aeruginosus spilonotus*).—We watched a very bold individual of this harrier kill a Philippine Cockatoo (*Cacatua*

haematuropygia). The cockatoo was too terrified to fly and did not make a sound when struck. The occurrence was observed at the San Pablo Airstrip on Leyte, March 2, 1946.

RALLIDAE. Rails, Gallinules, etc.

RUDDY CRAKE (*Porzana fusca*).—Single individuals of this rail were observed just before sunset on two occasions in the undergrowth close to a vine-covered outcropping of lava near Guiuan, Samar, June 7 (?) and August 2, 1945. On both occasions the bird eventually retreated to the crevices in the lava in which it may have lived.

CHARADRIIDAE. Plovers and Lapwings

PACIFIC GOLDEN PLOVER (*Pluvialis dominica fulva*).—This migratory species was first observed on October 28, 1945, near Mercedes, Mindanao.

SCOLOPACIDAE. Curlews, Sandpipers, etc.

WHIMBREL (*Numenius phaeopus variegatus*).—This migratory curlew was first observed on Jolo (Sulu Archipelago) on October 21, 1945, at which time it was seen in large numbers along the beaches and on sand spits in coastal marshes.

COLUMBIDAE. Doves and Pigeons

AMETHYST BROWN FRUIT DOVE (*Phapitreron a. amethystina*).—This little dove was found to be moderately abundant in the dense second-growth forests east and north of Guiuan, Samar. It was seen only singly or in pairs. During the day it frequented dense thickets from which it emerged only in the early morning hours and late in the afternoon. Unlike the White-eared Brown Fruit Dove (*P. leucotis*), which we later observed on Mindanao, it was never seen to perch in large trees but seemed to prefer low-growing vegetation. Like most of the forest doves, it is a very rapid flier and impresses the observer with its remarkable agility and maneuverability as it flies through the tangled undergrowth.

BLACK-CHINNED FRUIT DOVE (*Ptilinopus leclancheri*).—Delacour and Mayr report this bird to be absent from Leyte. Two individuals were observed along the Binalayan River south of Tanauan in a lowland forest area, on a trip to Lake Davao, January 3, 1946. Water surrounded the trees in which they were resting, so we were unable to approach closely enough to flush them.

CUCULIDAE. Cuckoos

VIOLET CUCKOO (*Chalcites xanthorhynchus amethystinus*).—A single example of this rare cuckoo was encountered in the forest on the crest of the lava plateau on southeastern Samar, August 2, 1945.

MEROPIDAE. Bee-eaters

CHESTNUT-HEADED BEE-EATER (*Merops viridis americanus*).—A flock of several hundred individuals was encountered in an upland marsh on Samar on August 1, 1945. The flock had departed by the following morning. We later saw several large flocks in freshwater marsh forests near Labuan and San Ramón, Mindanao, on October 25, 1945. In each case the marshes they frequented supported a growth of large trees about which the bee-eaters swarmed. This species was never encountered in open areas nor close to human habitation.

GREEN-HEADED BEE-EATER (*Merops superciliosus philippinus*).—This larger and less colorful bee-eater was observed almost daily from August 15 until November 3, 1945, in the outskirts of the city of Zamboanga, Mindanao. It was always seen in the immediate vicinity of open, brackish marshes. Unlike the former species, which was not seen to utilize man-provided perches, the Green-headed Bee-eater often perched on fence wires and posts. During the day, they were usually encountered as single individuals, in pairs, or in small, dispersed flocks occupied with the task of capturing insects in a manner similar to that of New World flycatchers. In the later afternoon they would congregate in large flocks to fly over the marshes in what appeared to be recreational flights rather than foraging expeditions. They would fly rapidly, following a straight course for several hundred feet, then wheel in an about-face and return over the same course. This activity might be repeated several times before the participants would pause to rest on the power lines or fence wires. On November 1, 1945, a flock of several hundred birds was observed dusting in a well-travelled road, unmindful of the passing traffic. This species seemed to be totally indifferent to the proximity of human activity.

CORACIIDAE. Rollers

DOLLAR BIRD (*Eurystomus o. orientalis*).—We encountered this roller in upland areas, as did Amadon and Jewett (Notes on Philippine Birds, The Auk, 63 (4): 545, 1946). It was common on the cleared hillsides at an elevation of approximately 2000 feet above the city of Zamboanga, Mindanao. It was also encountered in lowland areas under cultivation near San Ramón, Mindanao, in the dense lowland forests of the island of Manicani (off southern Samar), as well as in lowland second-growth forests of Samar, itself.

BUCEROTIDAE. Hornbills

WRITHED-BILLED HORNBILL (*Aceros l. leucocephalus*).—Contrary to the Delacour-Mayr statements that it is "solitary or lives in pairs," this species was encountered in large flocks in the foothill and mountain forests of the Zamboanga Peninsula on several occasions during the fall months. It was never observed except in flocks and it proved to be by far the most abundant hornbill in the area, with the Rufous Hornbill (*Buceros hydrocorax mindanensis*) in second place, and the Tarictic (*Penelopides panini affinis*) running a poor third.

TARICTIC HORNBILL (*Penelopides panini samarensis*).—The meat of this species is considered a special delicacy in the central Philippines. At a festival in Baybay, Leyte, on September 21, 1945, we saw the carcasses of four Tarictic Hornbills which were being prepared for the holiday feast. The birds had been collected in the mountains between Baybay and Abuyog.

RUFOUS HORNBILL or CALAO (*Buceros hydrocorax semigaleatus*).—Delacour ascribes this subspecies to Bohol, Leyte, Samar, and Panaon. Two birds were observed in the mountains between Ormoc and Burauen, Leyte, on October 2, 1945.

AEGITHINIDAE. Fairy Bluebirds

PHILIPPINE FAIRY BLUEBIRD (*Irena cyanogaster melanochlamys*).—Delacour and Mayr describe this species as being "rather uncommon and shy." In the lofty forests which border the Tumaga River above Zamboanga, Mindanao, we found it to be quite common and not particularly shy. It and the Philippine Trogon (*Harpactes ardens*) were the most frequently encountered and most easily observed of the birds inhabiting the lower levels of the forest.

PYCNONOTIDAE. Bulbuls

PHILIPPINE BULBUL (*Microscelis g. gularis*).—Delacour and Mayr express the belief that this bird prefers high trees. The species was common in the second-growth vegetation about Guiuan, Samar. High trees in the area were limited to coconut palms (*Cocos nucifera*) in which this bird was never seen perching. However, it seemed perfectly content to share the lower vegetation with the Yellow-vented Bulbul (*Pycnonotus goiavier*).

WATTLED BULBUL (*Pycnonotus urostictus*).—A pair of these friendly little birds nested in March, 1946, in a *Casuarina* tree in front of our barracks at San Roque, Leyte. The nest contained three speckled white eggs. The species seems to seek the protection of man's habitation.

STURNIDAE. Starlings

LESSER GLOSSY STARLING (*Aplonis minor*).—A specimen of what was probably this species was collected by Dr. W. P. Stewart on September 23, 1945. It was one of several starlings in the crown of a coconut palm in a lowland area near Mercedes, Mindanao. Unfortunately, because the specimen was badly mutilated it was not saved. However, because of its small size, the strong violet iridescence of its plumage, and the lack of greenish iridescence, it very probably belonged to this species. It is regrettable that the specimen, regardless of its condition, was not saved, since specimens previously collected in the Philippines have come only from Mindanao's midmountain zone (Delacour and Mayr).

COLETO (*Sarops calvus*).—On August 11, 1945, a nest was discovered in a coconut palm at the San Pablo Airstrip, Leyte. The nesting hole was fifty feet from the ground, and was seven inches high, five inches wide, and circular in shape. The nesting material consisted only of coconut fibre. Two young birds were in the nest. Both were covered with dark pin feathers at about four weeks. The wattles were flesh colored. The young birds grew nicely, and, accompanied by their parents, left the nest on October 5, 1945.

NECTARINIIDAE. Sunbirds

YELLOW-BACKED SUNBIRD (*Aethopyga siparaja magnifica*).—Delacour limits this species to Cebu, Negros, Panay, Sibuyan and Tablas. For a period of three months (October–December, 1945) we observed this beautiful sunbird in most of the second-growth areas surrounding Tacloban, Leyte.

Zoological Society of San Diego
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NESTING BEHAVIOR OF THE POOR-WILL

BY ROBERT T. ORR

A GREAT deal of information remains to be gathered concerning the behavior of our North American caprimulgids, and few species, if any, have been the subject of intensive study. The Poor-will (*Phalaenoptilus nuttallii*) of western North America is one of those less known, although valuable contributions relating to its natural history have been published from time to time, in recent years notably by Elmer C. Aldrich (Condor, 37: 49–55, 1935). These have been admirably summed up by A. C. Bent (U. S. Nat. Mus. Bull. no. 176: 187–198,

1940). While the present account is brief, merely representing observations gathered incidentally during a two-week period of general avian field study at Lake Tahoe, California, in the summer of 1946, certain heretofore unrecorded facts pertaining to the behavior of this species are presented.

A Poor-will nest, if the pine-needle-matted earth on which two eggs were deposited may properly be referred to as such, was found by Gordon Kishbaugh, Ranger in charge of D. L. Bliss State Park, on June 10, 1946, and shown to the writer and his wife, Dorothy B. Orr, on the following day. Since it was within 100 yards of our camp, about one mile southwest of Rubicon Point, Eldorado County, it was possible to follow certain phases in the behavior of the nesting pair for the ensuing two weeks of our stay. Some difficulties developed during this period since the nest was very close to a public camp site, and on the several occasions that the camp was in use no observations were made.

The general region in which the Poor-wills were nesting was clothed with a high Transition forest, so characteristic of much of the lower western side of the Lake Tahoe basin, composed principally of Jeffrey pine (*Pinus ponderosa* var. *jeffreyi*), sugar pine (*Pinus lambertiana*) and white fir (*Abies concolor*). More specifically the locale consisted of a rocky knoll strewn with large granite boulders on the top of a long, broad ridge. Conifers of the species previously mentioned were scattered over the knoll but the nest itself was at the edge of a patch of huckleberry oak (*Quercus vaccinifolia*) in a small, log-strewn clearing. Clumps of brush, consisting of tobacco brush (*Ceanothus velutinus*), green manzanita (*Arctostaphylos patula*) and bush chinquapin (*Castanopsis sempervirens*), in addition to huckleberry oak, were scattered about the immediate vicinity.

On the evening of our arrival, June 10, the call of a Poor-will was heard intermittently between 7:30 p. m. and 8:30 p. m. to the west of camp and in the general direction of the nest. The next morning, at 3:45 a. m. a Poor-will was again heard calling. This was approximately at dawn and about five minutes before the Western Tanagers began to sing. Early that afternoon the nest was seen by us for the first time. Its situation was such that the sun only shone on the site at this time of day and even then the rays filtering between the small oak leaves cast a pattern so similar to that of an incubating bird that was present that, even when the exact position of the latter was known, it was impossible to distinguish it at a distance of more than fifteen feet. As we approached closely the adult flew up and disappeared behind a small group of boulders. Almost immediately it was

heard to call about six times. The eggs, two in number, were in a very slight depression on a carpet of pine needles, partly beneath the overhanging foliage of the oak bush.

On our returning to the nest several hours later, an adult was again seen on the eggs. That evening an individual of this species was heard calling regularly between 7:50 p. m. and 8:35 p. m., and again at 9:35 p. m. The number of times the *poor-will* call was repeated during any one period of vocal activity varied from three to twenty-five and the interval between successive calls averaged about one and one-half seconds. When calling commenced at dusk, the time between these series of vocal outbursts was of short duration, frequently only a few seconds. As it became dark, however, the periods of silence became increasingly longer. Judging from the utterances, which were believed to come from one bird, this individual ranged over a distance of several hundred yards along the course of a small 'draw' that circled the northern and western sides of the knoll on which the nest was situated.

At noon, on June 12, an effort was made to photograph the eggs. The incubating bird allowed us to approach within two feet before flying, then fluttered over the same clump of boulders as on the preceding day and was lost to sight. This time no call was uttered. An examination of the nest at 3:00 p. m. showed the bird to be absent. That evening a Poor-will was heard to give several calls at 8:20 p. m.

No observations were made on this species on June 13. The evening was exceedingly windy and no Poor-will calls were heard. The following day was equally windy and the presence of picnickers curtailed any observations. A brief glimpse at the nest, nevertheless, showed an incubating bird present at 3:00 p. m. At 8:15 p. m. the call of this species was heard from the same general vicinity as before. It continued intermittently, however, for only a few minutes.

On the evening of June 15 the call of a Poor-will was heard at 7:52 p. m., which was just before dusk. An immediate visit to the nest showed the eggs to be warm but unattended at the moment.

The presence of a camping party within twenty yards of the nest deterred us from examining it on June 16 and 17. The first evening call notes were heard at 7:53 p. m. and 7:48 p. m., respectively, on these dates.

On June 18 an incubating bird was flushed from the nest at 5:00 p. m. It allowed Mrs. Orr to place her hand within one foot of it, however, before it flew. After alighting between some rocks about twenty feet away, within plain sight of us, it called several times, then fluttered its wings as though to attract our attention or more probably to distract us from the eggs. The latter were as yet unhatched. While

the bird was performing, an Audubon Warbler, presumably one of a pair that was nesting in a near-by sugar pine, flew down to investigate. When the warbler came within about three feet of the Poor-will, the latter rapidly fanned its wings, thrust them far forward, then froze in a definitely defensive posture facing the smaller bird. The warbler retreated and, so as not to cause further disturbance, the observers did likewise. A brief glimpse at 5:50 p. m. revealed a bird on the eggs. The first Poor-will call was heard at 7:50 p. m. that evening.

Our absence on June 19 prevented any observations that day. On our flushing an adult from the nest at 3:00 p. m. the next afternoon, however, one of the eggs was found to have hatched; the two halves of the shell were lying about six inches from the young. The latter was fairly well covered with buffy down, posssessing a slightly vinaceous tinge. It lay motionless, close to the unhatched egg, with the neck outstretched and the head resting on the ground. The eyes were closed and the young bird was silent. The adult flew to essentially the same spot as had the bird on June 18. After fluttering its wings for a few moments it rapidly protruded and retracted its large, dark, fleshy tongue a number of times. After this it flew up and over the rocks out of sight, although it was heard calling several times a moment later.

Having observed no more than one adult so far on any occasion, we decided that evening to learn more about the rôle enacted by both members of the pair. At 7:50 p. m., therefore, we concealed ourselves at the base of a large sugar pine about 100 feet from the nest. Our view of the latter was blocked by a fallen log and several small boulders but the top of the huckleberry oak bush, three feet above the nest, was visible. Five minutes later a Poor-will was seen to fly from the immediate vicinity of the nest, taking the same course as had been customary when an incubating individual was flushed from here in the daytime. It did not stop at the group of boulders about 20 feet to the north, however, but sailed between them, then turned to the west and headed down the 'draw' and alighted on the ground about 150 feet away. The *poor-will* call was repeated several times, after which the bird sallied a few feet into the air, seemingly after an insect, and returned to the ground near by. The call note was then repeated 25 times. Following this the bird flew about 50 feet to the southward and again alighted on the ground. A few moments afterwards it flew farther south along the side of the 'draw,' following the contour of the ridge, and was lost to sight. Several seconds later it was heard calling about 300 feet from us. The time was then 8:00 p. m. so, believing the nest to be unattended at the moment, we decided to determine whether or not the other egg had hatched. On approaching within

five feet of it in the fast waning twilight, we were surprised to flush an adult. This bird flew up from the nest, sailed about 25 feet away, and alighted on the ground where it fluttered its wings. Both in flight and after alighting it gave a soft, low note which might best be described as *quoit*. No sooner had this taken place than a second adult appeared, presumably the one that had been observed a few minutes earlier. Both birds appeared very alarmed at our presence and kept repeating the same note. They continually made short excursions into the air, frequently passing low over our heads and momentarily alighting within twenty feet or less of us, sometimes on the ground, sometimes on boulders or even fallen logs. Their eyes shone orange-red whenever the beam from a flashlight was turned upon them. A rapid examination of the nest revealed the one young and the remaining egg, as yet unhatched. The head of the young was raised this time. The remains of the egg shell that had been present earlier in the day were gone. We left immediately after our inspection, but the two adults escorted us for about 250 feet. They would fly a short way ahead, alight on the ground, and wait until we came to within a few feet of them, then repeat the performance. Their alarm notes, however, became less and less frequent the farther away we went.

The following day, June 21, we flushed an adult from the nest at 11 a. m. It alighted on the ground about 20 feet away, then flew to the top of a small boulder 10 feet farther on, where it rhythmically swayed its body from side to side. The eyes of the young were partly open. They probably could have been opened wide if necessary, but even adult Poor-wills, when disturbed in the daytime, rarely open their eyes more than half way. The remaining egg was pipped and a faint 'peeping' sound could be heard coming from it. As soon as we left, after taking a photograph, the parent was heard giving the characteristic *poor-will* call. The alarm note was never heard in the daytime.

That evening, at 7:40 p.m., we again concealed ourselves, this time behind a large rock 75 feet from the nest. A brooding bird was visible from this point. After a lapse of between 15 and 20 minutes, a patch of white was seen moving toward the nest. It was about three feet from the latter when first noticed and appeared to have come from the edge of an adjacent patch of huckleberry oak. Careful scrutiny in the dim light soon revealed the white object to be the throat patch of a Poor-will which was slowly waddling over the ground. When it reached the brooding bird one of them flew up and over the boulders to the head of the 'draw' about 100 feet away where it gave several calls and then was silent. This was believed to be the individual that had been incubating. In any event the remaining adult settled down

on the nest. No movements nor call notes were detected for the ensuing ten minutes. At the end of this time a slight motion on our part resulted in the appearance of the departed adult which sailed low over our heads, giving the alarm note, then alighted on a large rock about ten feet from us.

Mrs. Orr left our place of concealment at this time to investigate the nest while the writer remained hidden. When she approached to within a few feet of the brooding adult it flushed. A brief examination showed the second young to have hatched. The egg shell was close by and part of it was collected. Following this the observer left in the direction of our camp. One of the adults followed her, giving the alarm note and repeatedly flying up, then alighting on the ground ahead. Its behavior was similar to that participated in by both the Poor-wills on the previous night. The bird ceased calling and following her when she was approximately 200 feet away. After a brief pause she started to return part way to the nest to see what reaction might result. A Poor-will almost immediately appeared and the same alarm behavior was re-enacted. Meanwhile a flashlight, which had earlier been focused on the nest, was turned on, in so far as was possible without any perceptible motion or noise on the part of the writer. Within thirty seconds of the departure of the first observer and one of the birds, the other Poor-will was seen on the ground 15 feet from the young. It approached to within five feet of them by a series of hops, each one carrying it about one yard. The last five feet were accomplished by a slow clumsy waddle. Not wishing to further disturb the birds that evening, the writer quietly left.

A careful search of every square yard of the ground within a radius of 75 feet of the nest the following morning failed to reveal the presence of any Poor-will other than the incubating bird and the young. It was concluded that the second adult, if in the immediate vicinity, was more than 75 feet from the others.

That afternoon while I was trying to photograph the brooding adult, the subject flew up and fluttered to the usual place among the rocks near by. The young were six inches farther in under the overhanging cover of brush than they had been in the morning. After securing a photograph the observer concealed himself back of the same rock that had been used for this purpose the previous evening. In about five minutes the parent bird was seen to fly up suddenly, then drop to the ground in a zig-zag manner, landing in the shadow of a clump of chinquapin approximately 15 feet from the young. So rapid was this action that the bird could easily have been taken, by a casual observer, for a leaf being carried in a gust of wind. Furthermore, its coloration

blended so perfectly into the background that as soon as it alighted it seemed to disappear. Five minutes later, however, a slight movement was discerned beneath the edge of the chinquapin bush, about eight feet from the young. Although it was extremely difficult to see, it proved to be the adult slowly waddling back. It finally reached its goal and quietly settled down to brood.

That evening, at 7:45 p. m., we concealed ourselves much closer to the nest site. Mrs. Orr was about 20 feet north and the writer 32 feet west of young and brooding adult. We were both well hidden by low, sweeping branches of small white fir trees but at the same time were afforded full views of the nest site and immediate vicinity, each from a different position. At 7:55 p. m., a Poor-will flew in from a westerly direction and alighted on the ground three feet from the brooding adult. It remained motionless for several seconds, then looked around rapidly as though to determine whether or not any danger was near. Seemingly satisfied it then proceeded to bob its head up and down rapidly as it faced its mate. Each time the head went upward the white throat patch was prominently revealed, appearing almost like a signal. After bobbing about six times this individual waddled toward the brooding bird. The latter flew up when the approaching bird was within a few inches and disappeared over the boulders to the north. The new arrival then appeared to regurgitate food and transfer it to the young which could distinctly be heard calling. After each of the young had been given food several times, the parent settled down on top of them. Within six minutes the other adult returned, alighting on top of a large boulder about 25 feet away. During the next minute it sallied forth several times after near-by insects, returning in each instance to the same rock. Following this it circled over the nest, uttering three or four soft calls similar to the alarm note, then alighted on the ground close to the other. Waddling up to the brooding individual it proceeded to regurgitate and pass it food, then left. Within a few seconds it was heard to repeat the *poor-will* call nine times near by. Silence then prevailed for the following three minutes after which the bird returned, alighting on a rock for a few moments, then flying to the ground within a foot or two of the others. Again it went to its mate and seemed to regurgitate food. By this time the visibility was so poor that it was necessary to turn on a flashlight. This caused the pair to look about in a rather bewildered manner. The shine from their eyes was so bright that it was difficult to distinguish the outlines of their bodies. After a lapse of several minutes, the Poor-will that had returned with food waddled six feet away, then flew off. A slight motion on the part of one of the observers shortly

afterward caused the brooding bird to fly up, giving the alarm note. At this point Mrs. Orr left for camp and was followed by one of the birds for several hundred feet. Within a minute or so of her departure, one of the Poor-wills returned, circled over the flashlight, giving the alarm note, then landed on a near-by boulder. After a few seconds had elapsed, the other adult appeared and alighted on the ground about ten feet from the young. During the next five minutes the Poor-will on the ground regularly bobbed its head up and down, at the same time peering in all directions. The bird on the rock kept repeating the alarm note every few seconds, and occasionally flew about over the flashlight only to return each time to the same boulder. Finally all was silent and the adult on the ground flew to within two feet of the young, then waddled to them and settled down to brood. No activity, other than constant peering on the part of the brooding individual, was noted for the next 15 minutes. Following this the observer left.

Near-by picnic parties hampered observation on June 23 which was our last day. At 5:40 p. m., however, a brief inspection was made of the young. A brooding adult was flushed when an approach was made within four feet of it. This bird flew north toward the boulders and alighted on the ground 20 feet away. Here it extended its wings, occasionally fluttering them. This position was maintained until we left about one minute later. The young seemed definitely larger and gave the appearance of being more heavily clothed with down. One of them, when touched, opened its eyes and pecked lightly at the observer's finger.

SUMMARY

Observations extending over a period of two weeks were made on the nesting behavior of a pair of Poor-wills. The eggs, two in number, were in a slight depression on pine-needle-covered ground beneath the edge of a small bush in a forest clearing. They hatched on successive days, perhaps indicating that incubation begins with the laying of the first egg. The attending parent did not flush until approached very closely in the daytime, then usually flew a short way off and fluttered its wings to attract attention from the nest. Defensive posture was noted on one such occasion, when an Audubon Warbler came close. The young were fairly well clothed with buffy down at time of hatching and could open their eyes, at least partly, when one day old, possibly sooner. They were only observed being fed on one occasion and in this instance the food appeared to be regurgitated by the parent. The adults took turns at incubating and brooding. This exchange in regard to domestic duties was noted at dusk. The first evening meal

was administered by the newly arrived parent while the bird that tended the nest in the daytime gave the first evening *poor-will* call and seemed to assume the task of securing food for its mate. Although not observed, it seemed probable that the latter transferred food to the young. When one or both parents were disturbed at the nest at night, a soft alarm note was uttered and the intruder, upon departing, was followed for a distance of several hundred feet. In no instance was either of the parents seen to fly directly to the nest. The last few feet were accomplished on foot by means of a waddling walk. When the bird was returning in the daytime after being disturbed, the approach on foot was very slow. After dark it was made more rapidly and the distance traversed on the ground was frequently less. On one occasion all but the last five feet were covered by short hops. The white throat patch was seen to be displayed by at least one of the adults. The exact significance of this display is not known but it could have been for purposes of recognition. No attempt was made to distinguish the sexes of the adults.

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THE FLIGHT OF SWALLOWS

BY CHARLES H. BLAKE

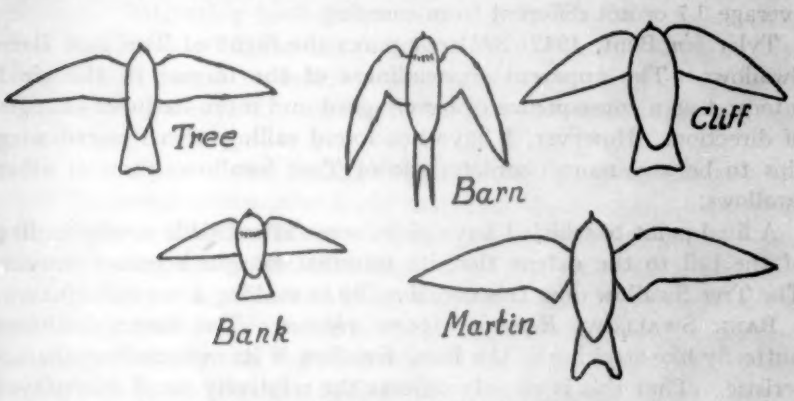
IT has long been known that each of our swallows has its own distinctive manner of flight. The best comparative descriptions I have found (Chapman, 1932, and Bent, 1942) give rather correct impressions but are a bit lacking in circumstantiality. In these notes I attempt to put down the rate of wing flapping during coursing (the ordinary feeding sweeps), the duration and attitude of gliding, and the usual geometry of the feeding maneuvers for the six northeastern swallows. For part of the species I have data on other styles of flight. The method of measurement and the definitions of terms will be found in a previous note (Blake, 1947: 619–620). The figures of the gliding attitudes (Text-figure 1) are simply diagrams, not to scale and not pretending to any artistic merits.

I hope the material given here may serve as a stimulus, not only to further investigation in the swallows but in other families as well.

TREE SWALLOW, *Iridoprocne bicolor*.—The flight of the Tree Swallow is especially marked by its custom of sailing in rather small circles, 20 to 100 feet or more in diameter (*cf.* Chapman, 1932: 383). The

glides are somewhat interrupted by single wing flaps which I call trimming flaps, since their purpose seems to be to reset the wings after a change of course relative to the wind. The end of a glide is often marked by a short, sharp climb made by a few (usually but three to five) quick flaps. I have not, however, found really characteristic the pattern of flight described by Hoffman (1927: 215) in which the bird rises and then drops at the end of a glide. Perhaps this is more characteristic of migration. There are certainly differences in some species of swallow between the flight of migrants and that of birds on their breeding grounds.

A glide, including trimming flaps, usually lasts from five to ten seconds even though much longer glides (32 and 34 seconds) have been



TEXT-FIGURE 1.—Gliding attitudes of swallows.

observed. When gliding the wings are widely spread and sensibly horizontal. Naturally this attitude is subject to variations, such as a partial folding of the wings when losing altitude. Some trimming is accomplished by basal torsion of the tail. My sketch of the gliding bird, worked out early in the breeding period of a resident pair, shows an indication of the notch referred to by Nichols (1920: 281) but not as distinctly as one made three weeks or so later would have done. It is possible that the wing molt which begins at that point may be started in early July and hence sometimes before completion of nesting. On this point there is the alternative that wear may be the cause. In a pair still feeding young, the female which is brown-backed, presumably just over a year old, shows little of the notch and her wings appear in good condition. Her mate shows a distinct notch (mid-July) and his wings are noticeably ragged.

I have 25 observations put down in my notes as coursing which

show a rather random distribution of flapping rates from 2.5 to 4.5 per second. These seem to represent one style of flight, although some almost certainly are from a bird sailing about its nest but not entering because of my presence. In any event, the observations are of about the same degree of consistency (standard deviation of about 20 per cent) as my other sets of swallow observations, which have definite modality. The average of the 25 observations is 3.5 ± 0.69 strokes per second.

A long, slow climb is made with the usual fairly deep strokes and is not distinguishable from coursing. Six observations of short, sharp climbs yield 4.7 ± 1.0 as an average and the greatest rate noticed is 6.2 strokes per second. Two observations of long, steady flight average 3.7 or not different from coursing.

Tyler (*in* Bent, 1942: 393) compares the flight of Tree and Barn Swallows. The apparent unsteadiness of the former in the air I interpret as a consequence of lower speed and more frequent changes of direction. However, I have not found sailing with lowered wing tips to be any more characteristic of Tree Swallows than of other swallows.

A final point to which I have given some attention is overspreading of the tail to the extent that its terminal margin becomes convex. The Tree Swallow does this occasionally in making a very sharp turn.

BANK SWALLOW, *Riparia riparia riparia*.—The fluttery, almost butterfly-like stroking of the Bank Swallow is its outstanding characteristic. That this is so only reflects the relatively small rôle played by gliding in its aërial maneuvers. The species does glide but its glides are very short and unstable, mostly lasting two seconds or less and ending with a few quick strokes. The wings are held horizontal or may droop just below the horizontal. Basal torsion of the tail is quite frequent and the tail is usually so spread that the terminal margin appears straight. The whole course covered by this species in feeding is very irregular, differing strongly from the almost predictable courses of Tree and Barn Swallows.

The attitude of the wings in gliding is rather distinctive, with the carpal joint far forward and close against the head, the trailing edge of the wings straight and transverse.

Twenty-four observations of flapping rates can be divided into two groups. The first contains 14 observations on the ordinary coursing which show an average of 2.8 ± 0.14, the extremes being 2.6 and 3.1. The second group (10 observations) shows the higher rate used in climbing or on recovery after a glide. Its average is 3.7 ± 0.36 with extremes of 3.1 and 4.5. The difference between these two groups is

significant. It is worth noting that each group is more consistent than I have usually found in swallows. At the end of a stroke the wings are bent well back but the forward (so-called recovery) stroke starts at once, with the bird not gliding in the terminal position.

My observations agree well with the main points mentioned by previous writers—the fluttering motions, irregular course, and absence of conspicuous glides. The reason for the relatively low flapping rates will be taken up later.

ROUGH-WINGED SWALLOW, *Stelgidopteryx ruficollis serripennis*.—I have had only one pair of this species under considerable observation and have not been able to satisfy myself as to some details. The flight is not, in my opinion, very closely related to that of the Bank Swallow. Migrating birds bear a marked resemblance in action to Barn Swallows, with the wings folded well back at the end of the stroke and changes of course rather infrequent. Doubtless, this is what Lynds Jones (1912: 177) had in mind in speaking of its apparent reserves of power.

The geometry of the feeding flights is not known to me in much detail but seems to comprise fairly long runs between turns, somewhat as in Barn or Cliff Swallows. What appeared to be a family party, with the young about two weeks out of the nest, was watched feeding over a small pond. The relatively long runs and short glides, as well as the wing motion, suggested the Barn Swallow. On the other hand, the slower flapping and the very marked climbs at the end of the runs were much more like the Cliff Swallow. Chapman (1932: 384) is correct in speaking of the flight as less erratic than that of the Bank Swallow, but without measurements my impression is of greater, not less, speed. The slow flight noted below is an exception. A rather similar statement is made by Forbush (1929: 162). The species may also, if disturbed near the nest, fly in circles with rather frequent but short glides. Under these conditions the usual glide lasts four to five seconds, although one was timed at 25 seconds. Even the trimming flaps end with the wings pulled well back. The normal glide position is almost as in the Tree Swallow but the wings appear a trifle wider at the base.

The styles of flight in the Rough-wing proved surprisingly diverse. Nine observations of coursing gave an average of 3.3 ± 0.47 strokes per second, the next to slowest rate of the six species studied. For the quick flapping, as used in climbing, I have six observations which average 3.9 ± 0.66; the extremes here are 2.9 and 4.4. In addition to these two styles, which are to be expected in most swallows, the Rough-wing uses two slow styles. Three observations of slow, steady

flapping all gave a rate of 3.2 per second. Finally, three observations of flap and glide flight (Blake, 1947: 620) while not too uniform were all rather slow and averaged 2.8.

This diversity of styles of flight only accentuates the rather numerous ways in which this species diverges from our other swallows. The most that can be said is that it shows some resemblance in flight to the Barn and Cliff Swallows but none at all to the Bank Swallow. If all its characteristics of behavior and structure are taken together, it seems quite unrelated to other North American swallows. See, however, Miller's (1947: 370) interesting remarks on *S. r. aequalis* in Colombia.

BARN SWALLOW, *Hirundo rustica erythrogaster*.—Those not familiar with the Rough-winged Swallow would say that the Barn Swallow in flight can scarcely be compared to our other swallows. Its aspect in flight is, in fact, very distinctive, but this is due to three causes, only one of which seems to be related to its manner of flight. These causes are the long tail, the gliding attitude, and its preference for coursing very close to ground or water.

Of this species it is fair to say that it courses in long runs which average roughly straight and seem often repeated. It is quite usual to see a bird reach the margin of a field and turn sharply back on its previous path. One may make not too bad predictions about what Barn Swallows will do. Even a quite small obstruction will often turn them back. This may be no more than the rank, unmown weeds along a drainage ditch. If one flies low along a certain stretch of road, as is common early in the season, then, in a few moments, the same or another passes that way. These long runs include frequent slight changes of course to right or left which tend to cancel one another. However, every so often, a bird gives within a small space an exhibition of stunt flying, with sharp turns, zooms, and dives that surpasses anything I have seen in other swallows. The Barn Swallow departs from this pattern when feeding over some special source of food, a group of cattle, or a strolling ornithologist; the general course becomes as circular as that of the Tree Swallow but held nearer the ground and at higher speed. Perhaps here, better than under other conditions, one feels the justice of Tyler's (*in* Bent, 1942: 392–393) emphasis on the strong drive of this species through the air. Chapman (1932: 385) compresses his account into too small a compass by speaking of all the patterns of flight in one breath.

This feeling of drive is accentuated by the relative rarity and the brevity of glides. The Barn Swallow, even when gliding, pulls the wing tips well back, which removes any hint of rest or calmness. Glides last mostly one to two seconds and infrequently three seconds.

The Barn Swallow seems to possess but two styles of flight—coursing and quick flapping. The former shows some departure from uniformity. The early, prebreeding observations average well below the general average of the 40 observations I consider to be coursing. The whole range is from 2.9 to 5.7 with an average of 3.9 ± 0.69. Omission of the one observation of 5.7, which may be wrongly assigned, would not change the average and would only reduce the standard deviation to 0.63. I have but three observations of quick flapping which were made during favorable examples of stunt-flying. These average 5.2.

As is well known the tail is carried nearly closed except when turning or braking for a landing.

Qualitative observations do not convince me that the actual speed of the Barn Swallow is much greater than that of other swallows, but its more straightaway flight gets it over the ground a good deal faster.

NORTHERN CLIFF SWALLOW, *Petrochelidon albifrons albifrons*.—In spring a Cliff Swallow may be picked from a flock of migrants by its pattern of flight. At fairly frequent intervals the bird climbs steeply on rapidly beating wings, not a mere five or six feet as others do but usually fifteen to thirty feet and perhaps more. Reaching the top of its ascent it may dive to the starting level or more often flutter downward. This pattern is maintained in a less extreme form throughout the season. The climbs are less high and more frequent; the bird appears to be riding an invisible roller coaster. When a Cliff Swallow and a Barn Swallow cross a pond on parallel courses, the difference of pattern is very striking. The latter exceeds the former in speed by about the proportion of the extra climbing of the Cliff Swallow. Evidently Hoffman (1927: 213) refers to this habit although I do not agree that there is any great risk of confusing the Cliff and the Tree Swallows on this head. The geometry of feeding flight is perhaps best described as a series of long ellipses—that is, intermediate between the Tree and the Barn Swallows.

The Cliff Swallow employs short and frequent glides which last, for the most part, two to three seconds, with one of 10 seconds recorded. The wings are held in an attitude intermediate between the attitudes of the Tree and the Barn Swallows. This is the only species which seems customarily to slant the wings downward when gliding.

Flapping rates for the Cliff Swallow are similar to those of the Barn Swallow. Ten observations of coursing show a spread from 2.9 to 4.5 flaps per second with more than half the observations in the upper half of this range. The average is 3.9 ± 0.55. There is also a quicker flapping used both for climbing and for turns. Seven observations of

this average 4.6 ± 0.41. The highest rate noted was 5.8 by an adult that had just left the nest. This is not included in the quick flapping series.

Especially on turns the tail is overspread showing a convex terminal margin. The Cliff Swallow does this more than the Tree Swallow but less than the Purple Martin.

PURPLE MARTIN, *Progne subis subis*.—My acquaintance with this species is limited to breeding birds, so I cannot say whether its manner of flight differs on migration or about its roosts from that described here. The account given by Sprunt (*in* Bent, 1942: 498–499) does not indicate any radical difference with season or special activity.

The pattern of flight, as I have seen it, is very uniform and at first sight quite identical with that of the Tree Swallow. Since the differences are almost wholly quantitative there is a likelihood of confusing these two species at a great distance. The martin sails in circles estimated to be mostly thirty to sixty feet across, with a rather regular alternation between quick flapping and gliding. The glides are mostly rather short, less than seven seconds, with the majority lasting three to four seconds. I have a record of a bird high in the air gliding for 26 seconds almost without the interposition of trimming flaps. The wings are horizontal in gliding. Changes of altitude tend to be slow. This may be summed up by saying the martin has plenty of power and speed but less maneuverability than the smaller swallows. In this connection the present species seems to employ the tail more vigorously than the other species. Basal torsion is so frequent as to be almost a definite characteristic. In a sharp curve or on landing, the tail is overspread so the terminal margin is convex. This happens so frequently and the pose is held so long it does not have to be watched for to be seen. Even in the Cliff Swallow, overspreading must be specially looked for.

In this species there is some doubt whether there is any real difference between coursing and the quick flapping used in climbing. Certainly the difference is small. I have noted four observations as coursing, and these average 3.8 flaps per second. The eighteen observations designated as quick flapping average 4.4 ± 0.51. Even if the standard deviation of each set were as little as 10 per cent of the average, the difference between them would be of quite doubtful significance. On the whole, I prefer to put the 22 observations together with an average of 4.4 ± 0.57 and extremes of 3.3 and 5.6. The martin, then, can be said to have but a single style of flight.

DISCUSSION AND SUMMARY

It will be readily seen that there are three main patterns of flight—circles, long, straightish runs, and zigzagging. The choice of a pattern seems to be behavioral or psychological. Only in the case of the Bank Swallow does maneuverability appear to be a factor. A similar situation can be seen in the variable duration of glides. Each species is capable of gliding much longer than it usually does. Only the Barn Swallow, which glides in an attitude of reduced lift, can be said to be physically limited to brief glides, but here again the attitude chosen is a consequence of behavior, not of physical necessity. This may be pointed up by the case of the Chimney Swift which is said to have but two wing positions—fully open and fully closed; hence, if it is to glide at all, it must use the fully open position.

Turning to the wing-flapping rates, only in the Rough-winged Swallow was it possible to detect any styles of flight other than coursing and quick flapping. The point which seems at first sight odd is that the wing-flapping rates for coursing increase with increasing size of the species. We notice as premises: (1) The wing-loading (recalculated from Poole, 1938: 514, 515) increases a little with increase in linear dimensions—Barn, Rough-wing, Tree, 0.3 lb. per sq. ft.; Purple Martin, 0.5 lb. per sq. ft. This increase hardly affects the power required for maintenance of steady speed. It does increase the power needed for acceleration. (2) The speed of cruising does not diminish, and probably increases, with increasing size of the bird, and the power required increases at least as the square of the linear dimensions. (3) We assume as a first approximation that the wings are essentially a propeller on a horizontal shaft and that the increase in the size of the propeller is not in proportion to the increased power requirement. Then, each of these three premises, in varying degree, leads to an increase in wing rate for increase in size.

The difference in rate between coursing and quick flapping corresponds in a general way to the difference in maneuverability, although this point cannot be pushed too far. In any event, the difference is greatest for the Barn Swallow and nearly as great for the Tree Swallow, and least for the Rough-wing and the Purple Martin. It may be significant that the last species seems most dependent on the tail in maneuvering.

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THE DISCOVERY OF THE HABITAT OF GOULD'S HUMMINGBIRD, *HYLONYMPHA MACROCERCA*

BY WILLIAM H. PHELPS AND WILLIAM H. PHELPS, JR.

THIS species and monotypic genus were described by Gould (1873: 429) from a trade-skin obtained on the London docks from a lot containing others of the species. Later in the same year a large lot of skins of the same species was received in London, but since then no known records have come to light and the habitat of this large, striking, long-forked-tailed hummingbird has always been an enigma. Elliot (1878: 97) gives the habitat as "Northern Brazil." Salvin (1892: 326) says, regarding the range: "Uncertain; said to be the Amazon Valley near the middle."

Boucard (1893–1895: 284) describes the finding of the type specimen as follows: "A good number of specimens of this remarkable species were offered for sale in 1873 at the London docks. Another lot came shortly after. No more has come since. The typical specimen was a poor skin. It was secured by Mr. H. Whitely and sold by him to John Gould. I remember as if it were yesterday, and the excitement it caused to him. At that time I was living at Great Russell Street. He brought it to me at once, and I could scarcely believe that it was a real species. We thought at first that it was a tail of something else stuck into the body of a *Chalybura*, but after a careful examination we agreed that it was a new and remarkable genus. I have never been

able to know, with certainty, where it came from, but it is probable that the locality for this curious bird is north Brazil or Trinidad."

Hartert (1900: 124) says that the habitat is not known exactly, but is probably in the interior of northern or central Brazil. Brabourne and Chubb (1912: 128) designate "Venezuela" as type locality and give the range as "Interior of Venezuela."

Simon (1921: 352) says, regarding this species, that a definite locality had been given to Gould by Whitely—"Matura district, Manawas, on the Bia River, north Brazil"—but that he did not know that place and that he believed it to be rather fantastic. He says that, to his knowledge, the species had been sent to Europe only in two lots, the second one consisting of 60 males and two females according to Whitely. He calls attention to the fact that all the specimens were prepared in the manner of the old hunters of Trinidad who were accustomed to go on expeditions to the coasts of Venezuela, the Guianas and northern Brazil.

Peters (1945: 91) gives the range as "unknown" and in a footnote comments: "Simon believes that as all the known specimens of this bird are in the old Trinidad make, that they were collected by Trinidad hunters somewhere on the opposite mainland of South America between the mouth of the Orinoco and that of the Amazon. My own guess is that since *Hylonympha* is closely allied to *Heliodoxa*, a genus all of whose members are confined to the subtropical zone, the home of *Hylonympha* will be found somewhere in the mountains of Venezuela."

Jouanin (1946: 105), commenting on Trinidad trade-skins, says it was not probable that the Trinidad commercial collectors frequented the high mountainous regions of the Andes of Cumaná, of difficult access, because that beautiful hummingbird, *Aglaiocercus kingi berlepschi*, had never been found among the Trinidad skins. He concludes that some of the skins were collected in Trinidad, itself, and the rest on the adjoining coast of Venezuela, especially on the Paria Peninsula, and that it was improbable that the native hunters would frequent the unhealthy region of the Orinoco delta.

Regarding *H. macrocerca*, Jouanin (p. 110) says that its habitat remains a complete mystery, that Simon was right in considering Whitely's "Marrawas" locality fantastic, and that the only thing certain is that the specimens are Trinidad trade-skins, from their make. He calls attention to a paper entitled 'Note sur *l'Hylonympha macrocerca*' by E. Deyrolle (Revue et Magasin de Zoologie, [ser 3] 7: 63, pl. 2, 1879), in which that author, a well known Parisian naturalist, says he received from Rio de Janeiro a number of skins of this mysterious bird. He believes however, that the Rio region was not the

habitat of the species but only a secondary source of supply, the skins having been shipped to Rio which at that time was a center for shipment to Europe not only of hummingbirds of all origins but also of butterflies.

De Schauensee (1947: 113) says: "Because *Neolesbia* is so rare in collections does not necessarily mean that it is rare in nature or that it is a hybrid. All one need do is to point to the case of *Hylonympha macrocerca*, one of the biggest (no less than 8.5 inches in total length), most distinct and brilliant of humming birds, which was described from trade skins as far back as 1873 and whose country of origin still remains a mystery."

Peters's guess was right. Ramón Urbano, collector for the Phelps Collection, obtained five males and nine females between September 13 and 23, 1947, on the summit of Cerro Azul, at the altitude of 920 meters (3036 feet). This mountain lies immediately back of Cristóbal Colón (Macuro) at the tip of the Paria Peninsula and only about 25 miles distant from the main island of Trinidad and 30 from Port of Spain.

Urbano says the mountain is called "Azul" (blue) because it is usually enveloped in dense mist. He describes the summit as very damp with abundant mosses and high corpulent trees. A partial identification of the avifauna of the summit shows that it supports a number of subtropical species. Chapman (1925: 3) calls attention to the fact that subtropical species descend to much lower levels in northeastern Venezuela than in Colombia; he says: ". . . others, which in the Colombian Andes we are not accustomed to find below four or five thousand feet occur as low as two thousand four hundred feet in northeastern Venezuela."

The inhabitants of Cristóbal Colón tried to dissuade Urbano from collecting the upper slopes of the mountain by telling him of the great danger from the deadly bushmaster snake (*Lachesis muta*, "coaima") which they claimed was very abundant. On that account he had much difficulty in obtaining the necessary guides. He did not encounter the snake. He camped in a vacant hut at 500 meters altitude on the trail from Cristóbal Colón to the Caribbean coast which crosses the flank of the mountain at 800 meters elevation. From there he collected on the summit every day by cutting trails.

There have been four other collections made on the Paria Peninsula. It must have been that those expeditions confined their collecting to the Tropical Zone without ascending the mountains into the Subtropical Zone or they, most assuredly, would have found *Hylonympha;* it is a common bird as shown by the number which arrived in London

in 1873 and by our series collected now on Cerro Azul. These previous collections (Phelps 1944: 325–444) were: 1895—Compte de Dalmas, Yacht Chazalie, who collected at Güiria and Yacua; 1913—Leo E. Miller (American Museum of Natural History) who collected at Cristóbal Colón, May 4–June 29, 595 specimens; 1911—Francis E. Bond (Academy of Natural Sciences of Philadelphia), who collected 71 species at Cariaquito during July and March; 1937—Gladys Gordon Fry (Weber Venezuelan Expedition), who collected 178 specimens at Yacua, Pargo, San Francisco and Güiria in February and March.

We know that Miller collected on Cerro Azul at an elevation of 500 meters, as his types of *Columba subvinacea peninsularis* Chapman, and *Oreopeleia linearis pariae* (Chapman) were collected at that altitude on the "mountains above Cristóbal Colón."

Probably *H. macrocerca* will be found in the Subtropical Zone of the entire Paria Peninsula mountain chain as it is continuous. The reason why it has not been found in the Mt. Turumiquire region, farther to the west, is probably because there is a tropical break in the Cordillera south of Carúpano in the region of El Pilar. Urbano collected a number of Subtropical Zone birds on Cerro Azul which are unknown in the Turumiquire region, showing that the Paria Peninsula has an indigenous subtropical avifauna.

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Caracas
Venezuela

ANTING BY FOUR SPECIES OF BIRDS

BY HERVEY BRACKBILL

SINCE anting by birds became a prominent topic several years ago and I first became aware of the act, I have seen fifteen performances by four species of birds in the wild. This experience bears out the suggestion of Mrs. Margaret M. Nice (1945: 302) that anting may be comparatively common and merely overlooked by ornithologists, partly because it is not always done ostentatiously. The performances I saw varied greatly in both manner and duration.

The birds I have seen ant are the Southern Robin (*Turdus migratorius achrusterus*), twice; Starling (*Sturnus vulgaris*), twice; Catbird (*Dumetella carolinensis*), four times; and Purple Grackle (*Quiscalus quiscula stonei*), seven times; the last-named species has not previously been recorded as anting with ants. The dates have ranged from May 15 through all the spring and summer months to August 30, in the years 1943 to 1947, inclusive. Except for one in Prince George's County, Maryland, all of the observations have been made in Baltimore City.

For identification of the ants used, and comment on some maimed specimens, I am greatly obliged to Mr. M. R. Smith, Associate Entomologist, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. I am also indebted to Mrs. Nice and Mr. H. R. Ivor for criticism of the present paper, and to Mrs. Nice for the loan of A. H. Chisholm's *Ibis* paper of 1944.

My observations are as follows.

STARLING

August 30, 1943. Time: 5:15 p. m., Eastern Standard. Place: lawn in Walbrook section of Baltimore. Ant: *Lasius niger* var. *neoniger*. Observation: from third-floor balcony 50 yards away; 8 × binocular.

Half a dozen Starlings and a male Purple Grackle were foraging over the lawn when one of the Starlings began anting. It would snatch at the grass, draw quickly back and very erect while at the same time opening a wing and moving it forward so that the primaries were practically vertical, then make a rapid downward stroke of the bill along the under side of the wing's outer edge. At the start of the stroke the Starling's neck was stretched upward to the utmost; at that moment, extremely erect and elongated, it was in a penguin-like pose in which it seemed to have backed up upon its tail, and with each downward stroke of the bill it almost toppled over backward. After the single stroke it would snatch again at the lawn, then repeat the performance. It anted four or five times, usually the left wing. What it did with the insects afterward I could not tell; I could find no maimed or dead ones where it had worked. The other birds, only a few yards away, paid no attention but went on foraging until, a few minutes later, all of them flew away toward a roost.

June 21, 1945. 5:25 a. m. Lawn in Howard Park section of Baltimore. *Formica fusca* var. *subsericea.* Watched from ground 25 yards away; naked eye.

This Starling would pick at the ground, raise one wing slightly above the horizontal and twist it forward a bit, then deliver a backward stroke of its bill. With details sometimes obscured because it faced away from me or went behind tufts of tall grass, the Starling anted several times, using both wings. In an attempt to improve my view I started toward the bird; at that it ran away a few feet, but when I then retreated it returned and anted one more time, clearly delivering a single stroke of the bill somewhere along the wing's under surface. Then it walked away. At no time had it risen erect or threatened to topple like my first Starling; its body remained practically parallel to the ground and only its head was raised any distance—for the start of the stroke. I was again unable to tell what was done with the ants used.

ROBIN

June 16, 1946. 7:40 a. m. My own lawn in Forest Park section of Baltimore. *Lasius umbratus mixtus aphidicola.* Watched from second-floor window 20 yards away; binocular.

This Robin, while foraging, came to a part of my back lawn that had been inhabited for at least a year by the ants named and had repeatedly been the scene of anting. Without taking any awkward or erect poses, the Robin a number of times opened a wing about horizontally and then dabbed at the under side; on the only occasion

that the bird's position permitted a good view, the stroke appeared to be delivered about halfway back from the bend and an inch or so in from the outer edge. A couple of other times the breast seemed to be dabbed, but I could not be sure that the bill actually touched it. This bird did no squirming among the rather numerous ants, as some observers have seen Robins do, but once or twice it did 'sit' briefly as if holding its vent to the lawn. The anting lasted only a minute or two and was desultory; the bird sometimes moved about between performances. Its dabs at the ground, furthermore, were so few that ants must have been used for more than one stroke, or else the mere odor of them caused the anting actions. Finally the Robin hopped away from the ant region and disappeared.

A few minutes later a color-banded male Robin foraged briefly on the edge of the ant area without performing.

ROBIN AND CATBIRD

July 26, 1944. 6 a. m. Clump of scrub pines near Branchville, Prince George's County, Maryland. *Formica fusca* var. *subsericea.* Watched from first-floor window 25 yards away, chiefly with binocular.

As many as three Robins and two Catbirds sometimes occupied this anting ground simultaneously, but more often only a single bird, and I never saw more than one perform at a time; whether this was always the same bird of each species I could not tell.

The Robin was usually directly facing me when it anted; it never rose abnormally erect to start the stroke, nor backed up much upon its tail that I could see. After snatching up an ant it would merely open a wing and bring it forward a bit, then deliver a preening-like stroke of the bill back somewhere along the wing's under side. Only one stroke was made with any one ant, and I could never tell what was done with the insect afterward. Anting was seldom done twice in quick succession; between performances the Robin foraged about and apparently ate, and even in this intermittent way the activity seldom continued for more than one or two minutes at a stretch. After the scene had once been entirely deserted, however, birds did shortly return and again ant briefly.

The Catbird's anting was lightning-like. This bird would pick up an ant and then, while standing normally, would merely *flip* one wing and, during the instant that it was open, dart its bill back at the under side and forward again. The whole act was performed in a flash. It was done several times in exactly the same way, and both wings were used. After one stroke the bird raised its head and made eating motions of the bill, undoubtedly swallowing that ant; what was

done with the others used I could not tell. Like the Robin, the Catbird foraged between times; when walking about in those intervals it held its neck and head higher than normal—with bill pointing upward at about 30 degrees. Ants proved to be both few and scattered on this needle-carpeted ground; I could find no maimed or dead ones.

In Baltimore on May 30, 1946, a Catbird dropped from a 'bird' cherry tree in which it had been eating very sour fruit, and on the lawn below ate a few ants of this same species without doing any anting.

CATBIRD

May 15, 1946. 5:57 a. m. My lawn in Forest Park. *Lasius umbratus mixtus aphidicola.* Watched from second-floor window 20 yards away; binocular.

This Catbird, a color-banded male on his territory, alighted on the lawn (which was wet from a night rain) and hopped about for a few seconds, foraging; then began to ant. He seemed to half squat throughout the performance, not actually resting on the ground but not standing normally, either. After a dab at the lawn he would raise the right wing about horizontally and probably move it forward a bit, then give a dab beneath it. In contrast to my first Catbird's lightning-like performance, this bird took perhaps half a second to a second for each anting. The half-dozen or so performances were unevenly spaced, and in some of the intervals the bird sang a couple of phrases. I could not tell what was done with the used ants. The anting lasted less than three minutes; after it, the bird ate what seemed to be a slender larva, then flew out of sight.

Although this Catbird in 1946 held territory through July 25 and had two nests only 25 and 35 yards from the ant colony, he was never again seen to ant in that year. He did ant again, however, in 1947; my observation then was as follows:

May 24, 1947. 6:20 a. m. Lawn adjoining my own. *Lasius niger* var. *neoniger.* Watched from second-floor window 20 yards away; naked eye and 8× monocular.

During foraging over the lawn, which was very wet with dew, the Catbird paused at one place and anted four times. He again appeared to take a half-squatting position, and kept his tail stretched out behind him on or just above the grass, bent a bit to the right. After a dab at the ground, he would partly open a wing and then make one stroke of the bill back along its under side at about normal preening speed. After the four antings he resumed his foraging and soon worked his way out of my view.

This color-banded bird in 1947 had returned to his previous territory on May 2 and at the time of the anting had a nest with eggs 26 yards from the scene. From the day of his return he had spent much time in the part of his territory that included the ant colony, but without being seen to ant.

July 22, 1946. 6:43 a. m. My lawn in Forest Park. Ants presumably *Lasius umbratus mixtus aphidicola;* no specimens collected. Observation from second-floor window 20 yards away; naked eye.

An unbanded Catbird flew down to the lawn (again wet, from rain) began foraging, and shortly anted twice, at an interval of possibly half a minute. It took no unusual posture; with its body about horizontal, it each time partly opened its right wing for a second or less and made one stroke of the bill back beneath it. After the second anting the bird foraged again in the grass for some seconds, then for five minutes alternately fed and idled at a feeding station close by, then flew away.

PURPLE GRACKLE

June 27, 1945. 3:25 p. m. My lawn in Forest Park. *Lasius umbratus mixtus aphidicola.* Watched from second-floor window 20 yards away; binocular.

A male Purple Grackle, coming upon the ant colony while foraging in my yard, anted from about 3:25 to 3:33 p. m. This bird anted not only the under side of the wing, but many other parts of its plumage. From my vantage point well above ground level I had two perfect views of the rump being anted while the grackle was facing directly away from me. I had also, from a '7 o'clock' angle, perfect views of the lower breast being anted, and in profile saw the extreme upper breast anted a couple of times. The scapulars were also unmistakably anted. Other strokes appeared to be directed to the belly and thighs.

At no time did the bird back up so that it trod upon its tail; it did rear back occasionally so that its tail lay flat on the ground behind it. It never rose completely erect in a penguin-like pose, although it did stretch its neck and head high to ant the extreme upper breast. All in all, it assumed the positions and performed the motions of simple preening, although most of its bill strokes were more vigorous than usual; it even scratched its head a few times during the anting, as during simple preening. The wing, when the under side was anted, was raised and twisted forward only moderately, and I am practically certain that the strokes were not confined to the outer primary but were delivered at least as often to more central feathers.

Usually the grackle made only one stroke with a single ant, but

sometimes more. What it did with the ants afterward I could never see during the performance, but later I found three maimed ones at the scene; one of these I succeeded in collecting without further injury. A few minutes after the anting, a grackle that I believe was the same one went to a near-by garden pond and drank.

At 6:05 p. m. a male Purple Grackle was anting at the same place in my yard, but flew away almost as soon as I discovered it.

July 4, 1945. 5:04 and 5:26 p. m. Place, ants and observation as on June 27.

Two male grackles flew down to the lawn. One began to forage; the other gave a song, with display, then it also began to forage; shortly both began anting. They performed steadily from 5:04 to 5:10 o'clock; frightened, then, by noise near by, they flew away, but at 5:26 both returned (undoubtedly the same birds, for they alighted directly at one side of the anting area) and at once one, and at 5:28 the other, resumed anting and continued until 5:34, when they were again disturbed and flew away for good.

For the most part, these birds during their anting 'sat' on the ground as if resting on the entire tarsus, with their tails stretched out flat behind them. Sometimes they made three and four strokes with a single ant—thrusts is a better word than strokes, for like the June 27 bird these usually dug their bills deeply into their plumage and not infrequently the act was of appreciable duration and the bill was moved about inside the plumage, as in ordinary preening. Again their actions in general were those of simple preening, and again there was absolutely no question but that other spots than the under edge of the wing were anted. The places were the upper breast; belly; possibly the side of the body beneath the raised wing; apparently some part of the wing's under side; some spot at the base of the tail (it apparently was beneath the root of the tail but reached from above with the tail bent aside out of the way); apparently the proximal inch or two of the tail's upper surface or coverts; upper rump; and scapulars. The birds now and then scratched their heads during the anting. I saw no hint of eating; on the contrary, this time I occasionally saw the birds snap their heads after anting strokes as if flinging the ants away, and I later succeeded in finding one maimed ant on the scene. Twice, when the birds were close to each other, they raised their heads high with bills pointing steeply upward.

Fifteen minutes after the anters had disappeared, a male grackle visited a near-by bird bath and drank repeatedly, then flew into a tree and preened for 22 minutes. During this period a second male drank at a garden pond. These were presumably the anters, for I never saw more than two birds in the neighborhood,

July 8, 1945. 6:25 a. m. Place, ants and observation as before. Two male grackles were already anting when I discovered them. One stopped almost immediately and disappeared. The other anted intermittently for two minutes, wandered some yards away, after two minutes returned and anted once more, then foraged away. These grackles stood normally during their anting, which oftenest consisted of one quick stroke delivered somewhere on the under side of the wing, although a few times the birds also seemed to stroke the thigh, and once the base of the tail was anted with the 'digging' action of the bill. Once five strokes, or thrusts, were made after a single dab at the ground. One bird at one time worked its way to the outer edge of the anting area and there ate a cutworm, then returned and resumed anting. Once when they were within a foot or so of each other these birds raised their heads high, with bills pointing upward. The grackle that did the principal anting foraged away afterward and was still roaming about, feeding, when lost to view 10 minutes later.

August 8, 1946. 4:15 p. m. A third lawn in Forest Park. *Lasius niger* var. *neoniger.* Watched from only a few yards; naked eye. So close to me that at times I was unable to focus my binocular, a grown juvenile grackle anted desultorily about half a dozen times, at intervals that probably were always half a minute or more. It anted the scapulars, the breast twice, the side, and the under part of the wing somewhere. The motion of the bill was usually the 'digging' one, rather than a 'stroke.' Some of the antings were executed in apparent excitement and with distorted postures. The ants used always seemed to be eaten afterward, and some were also eaten without being anted with.

Same day. 5:28 p. m. A concrete walk in Forest Park. *Lasius* (*Acanthomyops*) *murphyi.* Watched from second-floor window 30 yards away; binocular. Like the other grackles I have watched, this one—a male, which was molting (its head was almost bare)—anted the scapulars, upper breast, rump at the base of the tail, and once apparently the under side of the base of the tail, as well as the under side of the wing—which last it anted more frequently than any other spot, however, and more frequently than any other grackle I have seen. As many as three strokes were made with a single ant. The bird did not work with its tail stretched out flat on the ground behind it, like some of my other grackles, but often held its tail bent to one side—to the right, particularly—during a stroke or while reaching far back with the ant; it did not take any otherwise distorted poses, or do any toppling. During the anting it scratched each side of its head about twice. It

anted busily for 6½ minutes, then flew up into an oak and preened—including more scratching of the head—for two minutes, then flew down to a lawn and foraged away. While the bird was working I could not see what it did with the ants it had used, but when it had gone I found more than a dozen scattered over the sidewalk, crippled or dead; some of these I collected.

DISCUSSION

Numerous as my observations of anting have been, I am no more able than other observers to go beyond conjecture in explaining the activity. I had hoped that examination of the maimed ants I collected, by Mr. Smith, the entomologist, would be helpful. It does not seem to be, but as I have found only one other published statement on this point, I give Mr. Smith's comments.

Of one maimed *Lasius umbratus mixtus aphidicola* used by a Purple Grackle on June 27, 1945, and one used by the same species July 4, 1945, he said: "One worker with left side of head and prothorax crushed in. Other worker with head gone and prothorax crushed in. Both of these specimens were seized by birds near the anterior part of the body, that is, the head and prothorax."

All of 12 *Lasius murphyi* that I collected after the grackle's anting on August 8, 1946, were maimed or dead ones. Eleven of these were females and one a worker. Mr. Smith said of three: "Two individuals with the gaster slightly crushed at the base and another specimen with one leg (left front) missing and the gaster also slightly crushed at the base."

Chisholm (1944: 395) noted that after a group of Starlings had anted with *Camponotus consobrinus* the scene "was bespattered with dead and maimed ants, some 50 per cent. of which had their abdomens burst, while the others were more or less intact."

It is easier to discredit some of the anting theories already advanced than to propose better ones. Thus, my observations deal a further blow to the food-carrying theory. The color-banded Catbird of May 15, 1946, and May 24, 1947, was known to be on its nesting territory, and the Catbird of July 26, 1944, which apparently ate at least one insect during its anting, was probably on its nesting territory, for there was a nest with eggs only about 35 yards from the scene of the anting. Judging by the dates, the Starling of June 21, 1945, the Robin of June 16, 1946, and possibly even the Robin of July 26, 1944, were also probable breeders.

The food-cleansing theory likewise is further impaired since, just as Chisholm found maimed and dead ants numerous after Starlings

anted, I readily found three maimed ones after the Purple Grackle anting of June 27, 1945, one after the grackle anting of July 4, 1945, and twelve—I could have gathered more—after the grackle anting on August 8, 1946. The grackles, like Chisholm's Starlings, were definitely not eating the ants, at least with any regularity.

I find myself inclining to suspect that Kelso (1946) has hit upon the explanation: "The habitual spreading of oil on the feathers for the function of irradiation and vitamin development and later ingestion [through preening] also offers an explanation for 'anting,' the occasional smearing of the feathers with ant exudations, vegetable juices, or other organic matter . . . Many organic liquids are affected by exposure to natural or artificial ultra-violet radiation. They can also absorb products of previous radiation."

That explanation would account for the 'typical' manner of anting, which otherwise is so puzzling. For example, Chisholm (1944: 397) notes that "the wiping or rubbing is always [?] done on less accessible spots, particularly the ventral surface of the primaries and the under tail-coverts. It can scarcely be supposed that the mere desire to cleanse food would cause the birds to take such pains—involving grotesque contortions and sometimes actual falls—in their efforts to apply ants to particular parts of the plumage."

Similarly, Ivor (letter, written before Kelso published his paper) says: "We are faced, according to my experiments, with the fact that two parts of the plumage only are anted. With the exception of the head, these two parts are obviously the most inaccessible to the bill of the bird. (This accounts for the contortions of the body.) This, in my opinion, precludes the possibility of accepting any of the heretofore suggestions as to the biological significance of anting, with the possible exception of pleasure derived. Even this does not seem logical, for were it done for pleasure, there are many parts of the body more readily accessible."

Later (recent letter), intensive observation of preening convinced Ivor that he had misjudged the inaccessibility of the two parts of the plumage to which he referred, namely, the under sides of the primaries and of the tail; he watched birds preen both of these "with no more difficulty than they experienced in reaching other accessible parts of the plumage." "The queer thing now seems to be," he writes of the anting performances, "why the tail is brought forward under the body in many instances. Apparently the position of the tail accounts for the tumbling, and not the position of the wing."

With that statement on the general accessibility of the remiges and rectrices to a bird's bill I agree, although it is pertinent here to

remark that plainly the remiges are more easily reached than the rectrices. This correction of view, however, merely adds significance to the parts of the plumage that are 'typically' anted; two things are to be noted:

First, the remiges and rectrices are the stiffest feathers a bird possesses; they are the ones against which an ant could be rubbed most forcefully, and so most effectively if the (instinctive) purpose were (*a*) to mash from it, or make it eject, a fluid for irradiation and (*b*) at the same time to keep that fluid on the surface of the plumage where it could best be exposed to the sun. (An ant rubbed hard against the body plumage would, it seems likely, be driven down into the soft feathers—my grackle antings perhaps illustrate this, although I do not know—and exude its juices there.)

Second, the ventral surface of the wing, and to a lesser extent the ventral surface of the tail, are directly exposed to the sun in one form of Passerine sun-bathing—the bird leans over on one side and opens the opposite wing's under side to the sun, also generally spreads its tail with the under side more or less exposed, while it fluffs out its body plumage and bends its head up and sideways, often with bill open and eyes narrowed or closed.

Is it not possible that just as the act of sun-bathing has thus become formalized (and into a most contorted and uncomfortable-looking pose), so the spreading of ant and other acids on the plumage for irradiation has also become formalized? The wiping of the ant or other object upon the easily-reached under side of the wing would seem to be the 'typical,' formalized gesture, which is elaborated upon to varying degrees by some genera or species of birds, or some individuals.

For it is not possible to apply to all birds, in the wild, Ivor's finding (1943: 54) with his controlled birds that ants "were rubbed only on the ventral surface of the primaries"—"or," he adds in a letter, "on the ventral surface of the tail, this last rarely." The various observations on grackles (Chisholm, 1944: 394; Parks, 1945; Groff and Brackbill, 1946; present paper) all show these birds anting or anointing the body, and usually the entire body. Also, Nichols (1943), Van Tyne (1943) and I (this paper) report a total of five Robins pressing their bodies to the ground in one way or another during their anting; this is not an act that could easily be misobserved.

The enthusiasm with which Ivor's birds ant, and the desultoriness of many wild birds' performances, appear, incidentally, to be in contrast. "From the middle of April until near the end of July," he says (1943: 54), "all of the birds which anted did so enthusiastically. . .

During the height of the anting season the act of anting seemed to engender a state of ecstasy so overwhelming that even domination and enmity were forgotten." All but three of the antings I have seen occurred within the seasonal range that Ivor mentions; nevertheless, many of them—those of the Robins, for instance, and that of the Starling of June 21, 1945—were so desultory that had I not already been familiar with anting, I should never have realized that these birds were doing it. Nice (1945) likewise stresses the casual and inconspicuous nature of June performances by the Cowbird (*Molothrus ater*).

Disinterest of another sort was shown, as I have already mentioned, by my color-banded Catbird, which in 1946 had nests through July only 35 yards from the ant colony and yet was seen to ant only on May 15, and in 1947 reoccupied his territory on May 2 but was never seen to ant until May 24. This lack of further records is not attributable to lack of watching; the ant colonies were only a few yards from my permanent banding trap—to which the Catbird each year often came for food—and had the bird anted with any frequency at all, I should certainly have seen him on more of the occasions. Similarly, other birds of half a dozen species that are known to ant, fed in my trap or foraged across the ant colonies without performing.

As for the forgetting of enmity by birds during anting, one of my male grackles sang and gave a typical display before another on the anting ground, while on each occasion that two males were present simultaneously both birds indulged in the act of raising the head, with bill pointing almost straight upward, that I take to be a dominance or intimidation display. The Catbird of July 26, 1944, also gave the latter display. The birds I have seen have also generally been calm enough to rove about, and feed, between antings.

Possibly when the true significance of anting has been determined, these apparent differences between the behavior of semi-captive and of wild birds will be explained. It would seem that laboratory workers might determine, now, the actual validity of Kelso's irradiation suggestion.

SUMMARY

Fifteen performances of anting by Robins, Starlings, Catbirds and Purple Grackles, in the wild, are described in detail; the Purple Grackle is an addition to the list of known users of ants for this purpose. The desultoriness of many of these anting performances, and some variations in the manner of anting, are contrasted with the high excitement and fixed pattern that have been reported for some semi-captive

birds. The rubbing of the ant on the under side of the wing is, however, regarded as the 'typical' anting gesture and the belief is expressed that, as another writer has already suggested, the purpose of anting may be the irradiation of certain fluids for the production of vitamin D; the behavior patterns of anting and sunning appear to be complementary.

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THE LAST PASSENGER PIGEON

BY WILLIAM C. HERMAN

THE passing of the last Wild, or Passenger, Pigeon at the Cincinnati Zoological Gardens on September 1, 1914, was an event noted by ornithologists throughout the world. The story of the total extinction of this wonderful American bird is one of the tragic chapters in the history of American ornithology; and its effect is even more far-reaching. It seems incredible that a species which was found over such a large territory in such enormous numbers could be completely destroyed.

Scarcely any other wild bird has attracted so much attention as the Passenger Pigeon, partly because it existed in such large numbers, and because its final extinction was so rapid. Volumes have been written on it and one feature always mentioned was that the birds congregated in large companies during the entire year—nesting, roosting, and feeding together. Flocks of a billion or more were recorded by reliable

observers. It was not able to exist in small numbers, such as a pair or two in a place, since apparently under such circumstances the desire for breeding ceased to exist.

A long time passed between Jacques Cartier, who was the first white man to mention "the turtle doves and wood pigeons" in 1534, and the death of the last survivor of the Passenger Pigeon in 1914. Thus its history is now complete. The man who, better than anyone else, is qualified to contribute the picture of the final act of this great tragedy is Mr. Sol A. Stephan of the Cincinnati Zoological Gardens in Cincinnati, Ohio [now still living at the age of 97] and from him the present writer obtained much of the information here presented.

Mr. Stephan took charge of the Cincinnati Zoological Gardens in 1878, previous to which time the Zoo had Wild Pigeons on exhibition and had had some success in raising them in captivity. At that time there were four pairs in the aviary which had been purchased in a western locality at a cost of $2.50 per pair; and others were added to this number. At this early date, Wild Pigeons were still to be found in large numbers, and some had visited the beech trees on the grounds that later were taken over by the Cincinnati Zoo. Even at this time Mr. Stephan realized that the Wild Pigeon was becoming scarce. As far back as 1857 a bill to protect it had been proposed by a committee of the Ohio Senate, but no action was taken. As prices became higher, Mr. Stephan became very anxious for the preservation of the species, and he determined to breed the birds in captivity in order to have them for purposes of exhibition. Their habits were carefully observed, with special attention to the diet. He learned that they thrived best on a mixed food of cracked corn, wheat, crackermeal, cooked liver, and eggs. While recent discoveries have been made in the feeding of birds and mammals in captivity, the diet used by Mr. Stephan seemed to be adequate.

The cage in which the birds were confined was a large one, 10 x 12 feet square, and 12 feet in height, which was sufficient to allow the birds to fly at will. They were kept here during both summer and winter, and at no time during their confinement had they any disease. Everything was done to encourage them to mate. Proper nesting material, consisting of straw and small twigs from the beech, was supplied, and there were placed in the cage little branches of beech trees on which the birds could place their nests. Nest building began usually early in April, and the crude nest, about 9 inches in diameter and requiring commonly three or four, occasionally six, days to build, was typical of the pigeon family. So frail was it that one could easily see through it. Both male and female labored in its construction. The birds laid only a single white egg, and had but one brood a year.

The incubation period was usually about two weeks. This might vary by reason of weather conditions, but if the eggs were not hatched in about this time, the nest was deserted. Frequently some of the eggs were infertile, probably a greater proportion than of those of birds not in confinement. Both male and female took part in the incubation, usually the male by day and the female at night, with great regularity. The notes uttered by the bird at this time were a short *coo-coo* in distinction from the usual call note of *kee-kee-kee.*

The young remained in the nest about 14 days, and were fed by regurgitation, in the usual pigeon fashion, a milky food given by both male and female parents. The skin of the young in the downy state was of a dark slate color. The adults normally molted in September, and in a few weeks had a new plumage.

In captivity, the Wild Pigeons became very tame, and when the keeper entered the cage to clean it or feed the birds, they would frequently alight on his shoulder. They also were very quiet and did not fight each other. Mr. Stephan managed to rear altogether about 14 Passenger Pigeons in captivity, and their average life in confinement was from 10 to 15 years. Finally but two birds were left, a male and a female.

When other zoological gardens learned that the Cincinnati Zoo had the only remaining pair, they offered prices which rose from $100 to $1000 for the pair. At this time Mr. Stephan was not anxious to dispose of such a valuable asset and wisely kept them, for they attracted ornithologists and other scientists from distant parts. The female of this last pair had been hatched in the Cincinnati Zoo in 1885, and was named 'Martha,' in memory of the wife of a friend of Mr. Stephan. This female pigeon became the last survivor of the billions that in flights once darkened the sky.

Martha and her mate built but one nest, and the lone egg that she laid in this proved to be infertile. Since both birds of this last pair were so old that it was apparently impossible for them to rear any young, eggs from Martha were placed under incubating Rock Doves (domestic pigeons), in the hope that the latter might hatch and rear the young to maturity. This failed because the eggs were infertile.

Two cousins of the Passenger Pigeon, the Mourning Dove and the Band-tailed Pigeon, occupied neighboring cages in the Cincinnati Zoological Gardens. The former bred in captivity, but the Band-tailed Pigeon did not. To exhaust every possible means of perpetuating the strain of the Passenger Pigeon, attempts were made to breed the latter with Rock Doves, Mourning Doves, and even Band-tailed Pigeons, but all to no avail.

Finally, the male of this last pair, after living in captivity for 26 years, died. Martha lived on; but later she became unable to fly as well as previously. Her perch had to be placed nearer to the ground in order to enable her to reach her roosting place. She was now 29 years old, an unusually old age in captivity. On the first day of September, 1914, at one o'clock in the afternoon, Martha was found lying on the ground, an inert mass.

The last Passenger Pigeon had gone like the 'Last of the Mohicans.' Nevermore was man to see any of the species in life. A reward of $1000 was posted for a nest found with a fresh egg. Many persons sent in eggs of the Mourning Dove and those of the Band-tailed Pigeon, but not one of the Passenger Pigeon was ever afterward discovered. Thus passed one of the most interesting American birds.

The body of Martha, with a number of the larger feathers that had been saved when the bird was molting, were well packed in ice and sent to the United States National Museum in Washington, D. C. Mr. William Palmer, the taxidermist, removed the skin. Dr. Robert W. Shufeldt made an anatomical dissection and published a description of this (Auk, 32: 29–41, pls. 4–6, 1915), giving the cause of death as advanced age.

Martha is now on exhibition in the United States National Museum, a sad reminder of the once great glory of her vanished race.

AN EARLY ILLINOIS RECORD OF "CORY'S LEAST BITTERN"

BY CHARLES KNAPP CARPENTER

ON June 1, 1909, I had the good fortune to take an odd example of "Cory's Least Bittern"—probably the first of two ever to be taken in Illinois. Now, thirty-seven years later, I am sending the belated news to the readers of The Auk. Possibly this long delay may make it more interesting now when it can be put over against the complete, though brief, history of this debated form as it is written upon the pages of The Auk over a period of about thirty years.

At the time of the capture of my bird, I was pastor of the First Methodist Church in Aurora, Illinois, and did my golfing with a camera over my shoulder, with a marsh for a golf-course and a suit of old clothes to protect me from the stagnant waters. A few miles west of Aurora, the Rob Roy Marsh was one of my favorite courses. It was less than 100 acres in extent but afforded perfect nesting conditions for numerous marsh-birds. Among the numerous nests were some thirty of the

Least Bittern (*Ixobrychus exilis exilis*). As I waded from one to another of the nests, to record whatever changes had taken place since my last visit, I saw a bird about four feet from me, hiding in the vegetation, in frozen attitude. It was breast toward me and so well concealed that I assumed it to be a common Least Bittern. Slowly getting the camera ready, I took two pictures to illustrate protective coloration. It is not very difficult to catch Least Bitterns when they are endeavoring to escape by hiding, and I thought to catch this one for further observation.

Moving forward very slowly and dimly realizing that it was an oddly colored bird, I was about to seize it when it started to fly. I knocked it down with my hand and easily caught it. To my surprise and delight I was holding a bird like a Least Bittern in most ways but black and white in color, with the white greatly predominating. I assumed it to be a male Least Bittern with patches of the normal black color remaining and the remainder of the body white—a splendid example of albinism. There was a slight wound on the elbow-joint of one of the wings with a fresh drop of blood on it. It did not impair the bird's motions. I surmised that a normally colored Least Bittern may have fought it because of its odd coloring and forced it down into the dense cover.

Taking it home I put it in a small bird-yard with some other marsh-birds (Green Herons, Least Bitterns, rails). These birds ate freely of chopped fresh beef, but the newcomer would not eat. This continued into the fourth day. Afraid that the bird would starve to death, Friday afternoon, June 4, I put the captive in a large box with a supply of small tadpoles in a pan of water. The bird was frantic for them, manifested no shyness whatever and ate greedily. Unfortunately I had an evening engagement out of the city and the next morning, when I returned, the bittern lay dead by the pan. I am confident that it gorged itself to death. The measurements were normal for a Least Bittern: length, 13.50 inches; length to tip of toes, 18 inches; wing, 4.80 inches; tail, 1.95 inches; tarsus, 1.60 inches; and extent, 16.90 inches. Because of the black coloring I assumed it to be a male bird, but upon skinning it I found it to be a female with swollen ova and swollen, flabby ovarian ducts. I am sure that the bird had laid its clutch of eggs. It then seemed to me that it must be a Cory's Least Bittern [*Ardetta neoxena* (Cory)] as it then was known, but an extremely albinistic example. I so labelled it, and it still wears that label which may be attributed to my laziness. The brief description of the coloring written at the time is as follows: "The bird is mostly pure white with several irregular black patches and some scattering

brown feathers. It is an extremely albinistic form and yet decidedly melanistic. While the general color of the bird is white, the back of the neck is dull black; also the interscapulars and wing coverts are irregularly dull black. A few brown feathers are scattered among the feathers of the lower neck, wing coverts and rump. The wings underneath are pure white with ONE tiny brown feather on the under side of the left wing. There is a patch of brownish feathers on the outer side of the right flank."

The day the bird was captured and several times later I worked the marsh diligently, hoping to find a nest with darker-colored eggs (such as some observers had reported) and a mate but without avail. The records that were kept on quite a list of Least Bitterns' nests threw no light on the story of my captured bird.

Now, sixty years after the first Cory's Least Bittern was found and some thirty years after the last one was taken, I have scanned the books and especially the volumes of The Auk since I became a member of the A. O. U. in 1894, assembling the material to see what kind of a bird this was supposed to be.

The first account and description of this bird is by Charles B. Cory and appeared in the April number of The Auk for 1886. The type-specimen, taken in 1885 and now in the Chicago Natural History Museum, was taken in the Lake Okeechobee marshes in southern Florida. Six others were taken in this locality, the last on August 15, 1891. These seem to be the only ones ever taken in Florida—all of them in a small area. This may be called the southern one of two colonies, albeit a very small one. One of the seven was a young bird, indicating nesting.

This first bird was given the name *Ardetta neoxena* and was at once accepted as a legitimate species. Coues accepted it as is indicated on page 888 of the appendix of the revised (3rd) edition of his 'Key' (1887). Ridgway in 'The Ornithology of Illinois' (1887) accepted the bird but changed the name to *Botaurus neoxenus*. The Auk for January, 1896, contains a splendid article by Frank M. Chapman that no person interested in this topic can afford to miss. There is a portrait of the typical bird, a list with data of the 14 birds taken up to that time, extensive descriptions and other information, an extensive bibliography, and an expression of his own attitude. At first he had considered it a color phase. Now he proved, to his own satisfaction at least, that it was a species in its own right. In 1896, Dr. Bowdler Sharpe admitted it into the 'Catalogue of Birds of the British Museum' then being published. Cory's 'Birds of Illinois and Wisconsin,' published in 1909, had a new name for the bird, *Ixobrychus neoxenus*,

and said that it had the blessing of the A. O. U. Committee on Nomenclature. In this book Cory said that the bird had not yet been observed in Illinois. I had taken my bird perhaps shortly before this but had not reported it. Barrows, the author of 'Michigan Bird Life,' gave the bird the same status but added this significant comment: "Several ornithologists have suggested that Cory's Bittern may prove to be simply a color phase of the Least Bittern." T. Gilbert Pearson, Editor in Chief of 'Birds of America,' published in 1923, still gave Cory's Least Bittern good standing. But in this same year, The Auk (40: 524, 1923) made the statement that the A. O. U. Committee on Nomenclature had elimated Cory's Least Bittern (*Ixobrychus neoxenus*) because "considered only a color phase of *Ixobrychus exilis* (Gmelin)". After a period of 37 years spent on troubled waters, during which this bird had had three generic names to its credit, it ceased to exist as a species in the ornithological books. But it had actually ceased to exist nearly ten years before this time.

Let me now bring these birds actually taken into one picture. The Florida colony was the first mentioned, numbering seven birds. At the other end of the territory involved was another group numbering 16 birds in all. These birds were taken in "a small extent of marsh" joining Ashbridge's Bay, Toronto, Canada. The first bird was taken May 18, 1890; the last Sept. 8, 1899. There were three immature birds in this group. Chapman in The Auk for January, 1896, gave the data for six of these birds; Fleming in The Auk for January, 1902, gave the remainder. This "colony" ceased to exist in 1899. P. A. Taverner in an interesting article in The Auk for April, 1928, p. 205, explained the disappearance of the bird in this locality saying that the marsh "has been reclaimed, industrialized and destroyed as a marsh-bird habitat." Those reporting on these two groups, in telling of nests and eggs, say that the eggs of Cory's Least Bittern are considerably darker than the eggs of *Ardetta exilis*. Here is another interesting phenomenon: the color phase involving the eggs of the birds in question.

In these two groups there are 20 adults and three young birds, taken over a period of 14 years, from 1885–1899. In addition to these, seven others from widely scattered areas have been taken. One of these was from the far east—Massachusetts (*see* The Auk, 12: 77, Jan., 1895). The others are from the midwest. One was taken in Wisconsin in 1896 (*see* The Auk, 13: 79, 1896). Two were taken in Michigan: my old friend, L. Whitney Watkins, took an adult male in Jackson County, August 8, 1894 (*see* The Auk, 12: 77, 1895), and later E. Craven took another on the St. Clair Flats (*see* The Auk, 77, Jan., 1905). In The Auk, 24: 338, 1907, Dr. Ruthven reported that

the University of Michigan Museum had received a specimen taken in Ohio.

And finally two were taken in Illinois; and if my checking is correct they are the last two ever taken. My specimen has been sufficiently mentioned: carrying the date June 1, 1909; an albino adult female, in the Rob Roy Marsh, west of Aurora, Illinois. And the last one of the list was reported in The Auk, 32: 98, January, 1915. This bird was taken by C. W. G. Eifrig in marshy land along the Fox River north of Elgin, Ill., about 60 miles north of where mine was taken.

Here, then, are 30 birds, 27 adults and three immature, found within a brief span of 30 years, 1885–1915. Perhaps there are a few others the data for which I have not found. But seemingly this will not change the picture very much. What has become of the Cory's Least Bittern as it was known? The years since 1915 have been years of much intensive collecting. While many marshes have been drained in the last 40 years, much remains and many normal Least Bitterns have continued to find nesting places. Why has not some collector found one of these variant forms?

The late P. A. Taverner, of the National Museum of Canada, in Ottawa, had an article in The Auk, 45: 204, April, 1928, protesting against the action of the Committee on Nomenclature but offering a unique theory to account for the disappearance of this bird: namely that these years mark the dying out of a species that had been long and well established. If one assumes this to be true he faces the puzzle as to why none of these birds had been found before 1885. If there were not as many collectors in the earlier years there were more birds, so the odds were even.

The coloration of these birds seems to present a greater problem than their disappearance. And the problem seems to be present whether we consider Cory's Least Bittern a distinct species or a variant form. The Committee on Nomenclature has given us its studied opinion and we may well accept that. But as a problem by itself, how can we explain this matter? Chapman accepted the status of the bird as a species but was frankly puzzled by the color variations. As one goes through the records in The Auk for these years he finds that many of the writers are likewise puzzled. Nearly every bird taken, besides being decidedly off-color if it is an *Ixobrychus exilis*, has other variations from the normal *Ixobrychus neoxenus*. Nearly every one of these birds shows some albinism, but there are no definite areas, there is no definite degree. There may be only one or two white feathers, with the remainder of the plumage as Cory described it, or there may be considerable areas involving nearly all of the body and in varying

degrees of whiteness. Moreover, in a few instances there are melanistic tendencies in which the same bird shows these contradictory manifestations. Nature is quite stern in drawing boundary lines and fixing limits. Why was she so lenient to this bird and how were the boundary lines removed?

Baileyville
Illinois

PERCY ALGERNON TAVERNER, 1875–1947

BY W. L. MCATEE

Plate 4

WITH the demise of our esteemed Fellow, P. A. Taverner, at Ottawa, in early May, 1947, ended an era in Canadian ornithology that surely will bear his name. That of the Macouns, immediately preceding, was summarized by the father-and-son 'Catalogue of Canadian Birds' (1909) and by its French edition (1916). Taverner, in the early years of his service as Ornithologist to the Museum of the Geological Survey of Canada, became pleasantly associated with both of these scientists—with the father, John, until his retirement in 1912, and with the son, James M., until his death in 1920. Relations with the latter, Taverner notes, were "always intimate, cordial, and helpful."

The last of the Macoun works appeared, as indicated, in 1916, and James M. contributed information, advice, and editorial assistance toward Taverner's first Canadian bird book, the 'Birds of Eastern Canada' (297 pp., 50 col. pls.), which was published in 1919. The Macoun volumes were primarily annotated catalogues, but Taverner planned his books as more broadly educational. In the introduction of his first book, he states that it "has been written to awaken and, where it already exists, to stimulate an interest both aesthetic and practical, in the study of Canadian birds and to suggest the sentimental, scientific, and economic value of that study; to assist in the identification of native species; and to furnish the economist with a ready means of determining bird friend from bird foe that he may act intelligently towards them and to the best interest of himself and the country at large; to present in a readily accessible form reliable data upon which measures of protective legislation may be based . . ." (1919: 1). This plan was adhered to in all of his officially published books on the birds of Canada, a section on economic status being included for every group for which the necessary information was available.

He thoroughly appreciated the great value of illustrations and provided pictorial keys, the drawings for which were made by Claude Johnson, as well as many other black and white cuts by himself, and he was fortunate in being able to include liberal numbers of colored plates by Frank C. Hennessey and Allan Brooks.

His second volume, the 'Birds of Western Canada' (380 pp., 184 col. pls.), was issued in 1926 in time for distribution at the first Canadian meeting of the American Ornithologists' Union, at Ottawa. Combining these treatises, he prepared that entitled, 'Birds of Canada' (445 pp., 187 col. pls.), which was published in 1934. The first of these books had two English and two French editions; the second also was reprinted; and the third was twice reissued by a commercial firm to which publication rights were given by the government. The same Toronto printer also published for Taverner two pocket field guides, one on land, and one on water, birds, both highly illustrated.

Properly to appraise Taverner's major publications, it should be realized that there have been no books of equal quality covering the birds of the United States. Neither the United States nor any other government has issued such well-illustrated ornithological hand-books, and the Canadian government had the opportunity to do so only through the creative ability and devoted efforts of Taverner. The Dominion deserves credit for embodying his productions in good form and for widely distributing them. It is said that these bird books can be found at the most remote Hudson's Bay Company and Royal Canadian Mounted Police posts and even in the hands of trappers throughout the vast Canadian wilderness. In the settled districts, they are handbooks for all bird lovers, have been used as texts in the schools, and are the accepted works of reference in their field. The plates of the colored illustrations have been lent and are still being lent to persons who use them in illustrating magazine articles and pamphlets, thus extending the influence of Taverner's work. It is said that sales of the books have been so large that the Government has been little if any out of pocket on the entire project.

Such accomplishment as that of Taverner in Canadian ornithology raises the question of what makes an ornithologist, and especially such a productive one. In all instances that I recall being traced, the individual was what is called a born naturalist. His earliest recollections are associated with natural objects, some or all of them birds. Apparently it is only from such inborn taste that the abiding interest and persistent industry follow that are necessary to a successful career in science. From biographical notes prepared by Taverner, himself, we learn that his earliest definite memories are of a kindergarten at

Highland Falls,[1] New York. They concerned hunting the first flowers of trailing arbutus in the spring, watching Baltimore Orioles and their nest in a tree in the front yard, and seeing in St. Nicholas Magazine a picture of a Scarlet Tanager. Certainly two of our most beautiful birds are involved in these childhood recollections.

The next step in ornithology, of which we have record, was his meeting on a street in Ann Arbor, Michigan, where he was living with friends, A. B. Covert, taxidermist of the University Museum, who invited him into his shop. There he became a constant visitor and unpaid assistant, learning taxidermy and studying birds. Associates in the latter endeavor were George Pray and Robert Wolcott. Weekends and holidays were devoted to bird trips with both enthusiasm and diligence. Making a collection of study skins, he sold 100 of them to the University for use in class work.

Going to Toronto later through the encouragement of friends, among them W. G. A. Lambe, he met J. H. Fleming (and here I quote from Taverner's biographical outline) "the outstanding Canadian ornithologist . . . and the only one having more than a parochial view, and in contact with broader fields. Fleming's great world collection, already under way, and his intensive study of Canadian ornithology were an inspiration to one who had long worked alone and far from current ornithological thought. Thus began a close friendship and collaboration that persisted steadily and uninterruptedly to the time of Fleming's death." That occurred in 1940. Then, Taverner continues, minimizing his personal achievements in paying tribute to his friend: "If Taverner ever accomplished anything of value in his chosen field, it was through the friendship, encouragement, and example of J. H. Fleming, whose influence upon him and upon Canadian ornithology can hardly be exaggerated." Details of his acquaintance with Fleming are contained in two contributions by Taverner to the Fleming Memorial Papers (The Brodie Club, Toronto, 1940, mimeographed).

As odd times permitted in connection with the study and practice of architecture, Taverner studied birds about Port Huron, Michigan, 1900–1902, and in the outskirts of Chicago, Illinois, principally around Roby and Wolf lakes, for the next four years. With architecture remaining his vocation, he then moved to Detroit, Michigan, where he found in B. H. Swales a congenial spirit, with whom holidays and many evenings were spent in the observation, collection, and study of birds of the southeastern part of the State. In Taverner's 'Memories

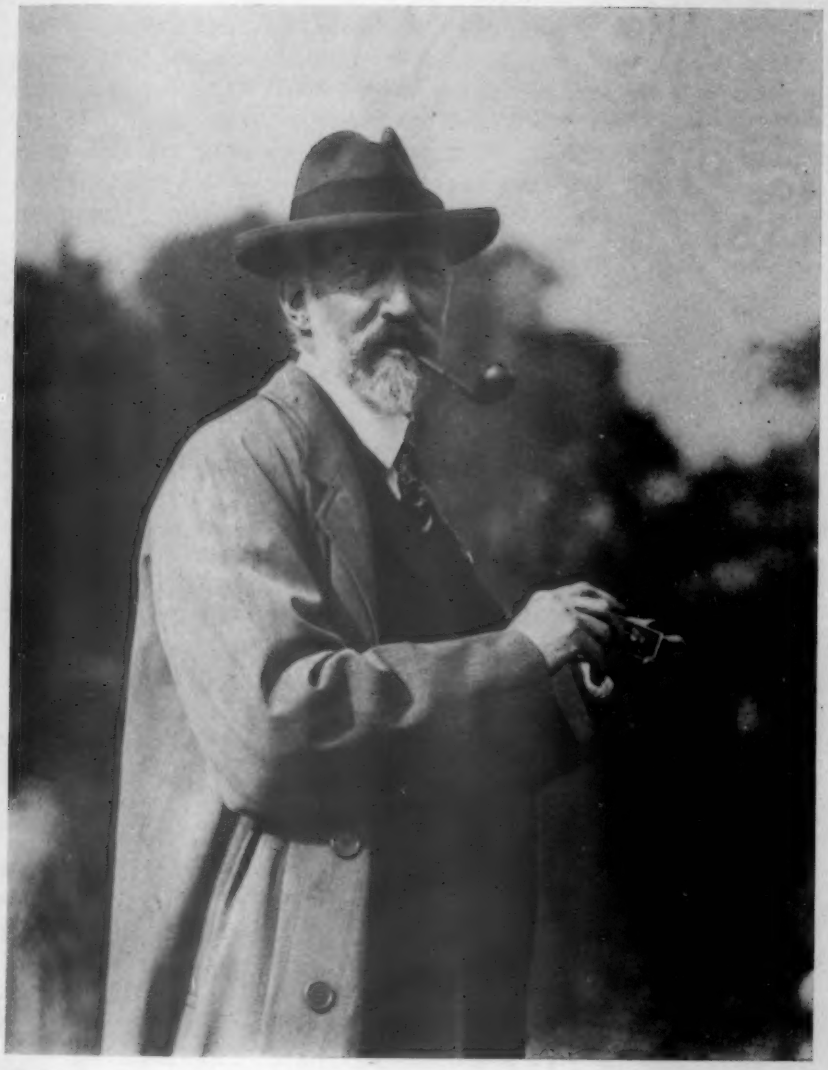
[1] This was the home town of E. A. Mearns, famous naturalist and explorer, whom, however, Taverner never met.

of William Edwin Saunders' (Auk, 61: 348, 1944), he notes that, in company with Swales and A. B. Klugh, he visited Saunders in March, 1905. Their host's glowing account of the flora and fauna of Point Pelee, Ontario, greatly interested the visitors and in time led to the formation of the Great Lakes Ornithological Club, including Saunders, Klugh, Fleming, J. H. Wallace, Swales, and Taverner. They had a manuscript bulletin, which was sent around the circle, commented on and added to, having each author's contributions removed when the bulletin came back to him. A shack was built on Point Pelee for a headquarters (Camp Coues) and much free time was spent there by the Club members and a few guests in the years 1905–1907, studying intensively the ornithology of the area. [The records of the Club, May 1905 to December 1927, are now in the Royal Ontario Museum of Zoology, Toronto.]

The results were summarized in a 135-page report on 'The Birds of Point Pelee' by Taverner and Swales in the Wilson Bulletin, 1907–1908. This communication devoted some space to the dryly humorous relating of irksome experiences of the collectors and contained some entertaining passages on habits and characteristics of the birds, evidently from the pen of Taverner.

It was in the Detroit period that Taverner, influenced largely by suggestions of Leon J. Cole, became interested in banding birds. He had dies made, numbered with them aluminum bands bearing a return address ("Notify The Auk, New York"), and distributed them among correspondents and friends. The only long-distance return was for a flicker banded in Illinois and recovered in Louisiana (reported in Wilson Bulletin, 1906). Thus Taverner, Cole and Paul Bartsch were pioneers of the existing bird-banding movement, and it appears that credit belongs to our subject for the plan of establishing a central office for issuing bands and maintaining records. The work soon became too extensive for an individual to handle and was later conducted, in turn, by the American Bird Banding Association (with support from the Linnaean Society of New York) and the United States Biological Survey (now part of the U. S. Fish and Wildlife Service).

Taverner remained in Detroit until 1911 when the post of Ornithologist to the Museum of the Geological Survey of Canada was established, and upon recommendation of J. H. Fleming, W. E. Saunders, and Ernest T. Seton, he was appointed to it, with the first title of Assistant Naturalist and Curator. The new Victoria Memorial Museum had just been completed (1910) and R. W. Brock, Director of the Geological Survey, contemplated development of a great



P. A. Taverner.

National Museum for which he assembled a creditable staff. He resigned in 1914. From 1916–1920, following the burning of the Parliament buildings, the Museum was commandeered for use by the Dominion Parliament. So far as the development of a natural history museum is concerned, conditions were discouraging from that time on. The apparently more economically important work of the Department of Mines dominated and the natural sciences were treated like poor relations. However, since the Geological Survey was primarily an exploratory body, funds for field work were comparatively generous. Thus, to add to the material collected chiefly by the Macouns and William Spreadborough and his personal collection (1,222 birds from Ontario and Michigan) sold to the Museum, Taverner organized, nearly every summer, one or more ornithological parties for the investigation of the avifauna of Canada. Those in which he personally took part carried him to: his old collecting ground at Point Pelee, Ontario, in 1913; Chaleur Bay and Miscou Island, New Brunswick, and Bonaventure Island, Percé, and the Magdalen Islands, Quebec (1914); Percé and Point Pelee, revisited in 1915; Shoal Lake, Red Deer, and Jasper Park, Alberta, and parts of British Columbia (1917); Ontario during 1918 and 1919; Alberta and Saskatchewan (with Hoyes Lloyd, 1920); Manitoba (also with H. L.), Saskatchewan, and British Columbia (1921), the last-named Province again in 1922; Saguenay County, Quebec (1924); Alberta and British Columbia (1925); Alberta (1926); Anticosti Island and Canadian Labrador (1928); eastern arctic islands and Greenland on the Beothic, a Dominion patrol-boat (1929) [I received a card from him postmarked Dundas Harbour, Ellesmere Land]; Churchill, Manitoba, and Chesterfield, Keewatin (1930); and various localities in western Manitoba (1936 and 1937).

Field ornithologists will appreciate Taverner's account in a letter to his mother and sister of a field mishap and the overcoming thereof. At Miscou, New Brunswick, in June, 1914, his party experienced a "historic storm" that forced them to abandon their tents. Upon examination the next day, he found: "Our precious bird skins were scattered all over the place and hammered flat in the ground and mud with the rain . . . I gathered them up as rapidly as possible and put them in their trays . . . not that I thought they were any good, but it seemed the proper thing to do." In a vacant, half-finished house they then occupied, "The specimens were hung in racks over the stove and . . . working on them all day . . . [he was able to report that] out of 130 birds we will not lose more than three or four."

Of interest to museum workers is the following extract from a letter written at Percé in June, 1915. He stated: "I also suggested [to a

preparator] a method of casting wax feet on the mounted birds. He tried it with great initial success . . . and hereafter we will have no more dried and mummied feet on our mounted birds. It is the first marked improvement in bird taxidermy in my time and I feel rather proud of it." My friend Herbert L. Stoddard recognizes this as the independent invention of a method that was being developed at the same time (*circa* 1913–1915) at the Field Museum of Natural History in Chicago, from which has arisen casting in celluloid and other materials, not only of birds' feet, but also of entire reptiles, amphibians, and fishes, that has revolutionized this branch of taxidermy.

The Canadian Arctic Expedition (1913–1918) brought back important material from the northwest coast, and correspondents and contributors filled gaps both in the collection and in knowledge. From year to year Taverner won increasing coöperation from other Divisions of the Museum and it is evident from the annual records of specimens received that, like Spencer F. Baird, he had the knack of getting other people to help in the good cause. Meagre and uncared-for at the time of his becoming curator, the bird collection of the National Museum grew from less than 5,000 to more than 30,000 specimens. So was the material gathered upon which Taverner exercised his talents for organization and exposition and which served as the basis for his books and numerous lesser publications on Canadian birds. A bibliography of the subject was established and every year augmented; information from all sources was incorporated in card files; and range maps were prepared and kept up to date so that the facts relating to all species were available for use with minimum effort. For a long period he took current literature home with him and carded Canadian items on his own time.

A. L. Rand, Taverner's successor as Ornithologist to the National Museum (now at the Chicago Natural History Museum) has kindly furnished the following description of the office system. "It included a species file, with every reference to a bird in Canada on a card, under a species heading. All these records were entered on large maps, one for each species. Different symbols indicated type of occurrence, as summer, winter, breeding, migrant, etc. Each symbol had a key number, and the reference was again entered on a facing page. This gave a summary of species distribution and time of occurrence in Canada. There was also an index to literature, an author file, and a gazetteer. The amount of detailed work that went into these was tremendous."

My impression of these works, as seen in Taverner's office, was wonder and admiration that he had succeeded with a minimum of help

in doing for Canadian birds in not to exceed 23 years (date of appointment, 1911, to issuance of 'Birds of Canada,' 1934) what the Biological Survey, with the participation of numerous persons, some of them over long periods, had not been able to complete for birds north of México since 1885.

The maintenance of such files becomes a burden and may have had an influence on Taverner's output. Thus Rand comments substantially as follows: In his early days, Taverner wrote some notable local lists, especially those on the birds of Point Pelee and of Red Deer River, Alberta, but soon his interest shifted away from faunal publications. A number of rather important collections were left unworked and unreported. He was for the most part alone, doing most of his own typing, filing, and mapping, and considerable office routine was involved in the systems he set up, including even the printing of cards and labels by hand press. The mounting bulk of cross-indexing may have had the effect of discouraging him from working up and reporting local avifaunas, as this would have required further indexing. Thus Taverner's impress on the taxonomic study of the birds of Canada is less marked than his tremendous popular influence.

However, he did some good taxonomic work, notably on the Canada Geese and Red-tailed Hawks. In a later study of the Great Horned Owls, he manifested an interest in variation, as such, aside from identification, and this work forms a bridge from an earlier form of taxonomy toward the newer systematics. [So far Rand.]

Apparently Taverner was impressed throughout his ornithological career with the importance of species in contrast to subspecies. He had a paper on trinomials in 1906 and in his 1915 'Suggestions,' he expressed views that he retained throughout life. One of these, with which we can well agree, was that the recording of subspecies should be based only on authoritative determinations and not, as frequently is true, upon geographic probabilities and assumptions. "But to bring this about," he wrote in a letter of April, 1938, "the ornithological public must be furnished with specific names that they can use without committing themselves to finer designation. This point should be insisted upon in the next Check-List." In that respect his views have been accepted and a good many of the species names in the new List will be those first adopted by Taverner in his books on the birds of Canada.

Taverner's ornithological publications number about 300 (The bibliography is being published in the Annual Report of the National Museum of Canada for 1947). Forty per cent of them appeared in the Ottawa Naturalist (14) and Canadian Field-Naturalist (114).

Classifying the titles, seven are the books on Canadian ornithology previously discussed, 69 are reviews, 47 records of unusual occurrences of birds, and 15 annual reports on his official work. There are 15 local lists and reports on collections, and 14 deal with subspecies, the general theme of which was the minimizing of attention to these subdivisions of species and stressing the greater importance of species as wholes. Six papers are revisionary but are restricted to Canadian representatives of the groups, five discuss problems of nomenclature, eight are on techniques in ornithology, and similar numbers relate to theoretical matters, to the economic status of birds, and to conservation.

His interest in the last two phases of ornithology was manifested in his large books and in special reports on the hawks and owls of the prairie Provinces and on the Double-crested Cormorant in the Maritimes. In that region he made a study of these birds in relation to the salmon fishery. Remarks in his letters on the work include: "The cormorant question is interesting. I always thought the damage they do was exaggerated but not to the extent that the evidence shows. Their effect on the salmon is almost nil. Those in tide and salt water feed almost entirely on sculpins and eels. Those in fresh must eat salmon . . . but in spite of them, there are more salmon today than ever before . . . I will have an interesting report to write as it touches several phases of the subject that I have always wanted to write about." (August, 1914.)

Another paper that he had long wanted to produce was read at the North American Wildlife Conference at Washington, D. C., in 1936. In it he had his say about conservation of waterfowl. The main trouble, he said, was too many guns in the field, and he asserted that adequate restriction of them had never been fairly tried. Of the writings not classified in preceding paragraphs, the subjects are so diverse as to defy summarization.

He contributed bird illustrations to the Bulletin of the Michigan Ornithological Club and no fewer than 13 wash drawings and 58 line cuts to W. B. Barrows' 'Michigan Bird Life' (1912).

He described as new four subspecies and had one named for him (*see* list at end). His monument, however, consists primarily of the three sound and thoroughly illustrated books on the birds of Canada and the great public interest in birds which they inspired.

It should not be forgotten that Taverner's work for the National Museum of Canada included far more than ornithology, especially in the earlier years. He was expected to develop a division of biology. Thus, after a short period of inventory of material and methods, he made a tour in 1911 of museums in Boston, Cambridge, Lancaster

(Mass.), New York, Philadelphia, Washington, Ann Arbor, and Chicago. Aided by this survey, he made comprehensive plans for the handling of collections and exhibitions in Ottawa which were approved by the Director of the Museum. In his report for 1911, he alludes to an Atlantic Coast habitat group being worked upon by Frank C. Hennessey and himself but which was not to be attempted in full scale until a properly trained preparator became available. In 1912, the model was completed and put on exhibition. The museum published instructions by him on the collecting of zoological material in which he had the cooperation of former Ann Arbor acquaintances: A. G. Ruthven (for reptiles) and Bryant Walker (for mollusks). The same year, in connection with attendance at a meeting of the American Ornithologists' Union, he made another round of museums at Cambridge, Boston, New York, and Brooklyn. For some years the annual reports of the Division of Zoology dealt not only with birds but with mammals, marine invertebrates, and insects. Loans of material to specialists in other museums became a feature, and educational activities, including lectures and circulating exhibits, were developed. Slides for the use of the entire Geological Survey staff were prepared in the Division of Zoology. Motion picture films made by Taverner in 1913 and 1914 are still being exhibited. They portray the bird cliffs of Percé and Bonaventure Island, showing the home life of the Gannet and other sea birds; and wild geese at the Miner Bird Sanctuary. Another showing consists of bird pictures made in his own garden, especially of Purple Martins, which occupied a house of his own design and construction. In 1919, R. M. Anderson became acting chief of division, later chief; but in 1937, an ornithological division was again instituted, upon which Taverner reported for the remainder of his career. He collected some mammals and wrote a few articles relating to that class and to butterflies, bullfrogs, poisonous plants, and plant protection.

His interest in the Museum did not cease with his retirement, for in addition to training his successor, he worked for revitalization of the organization. In an article published in the Ottawa Citizen and other papers in 1945, he pleaded for a great National Museum that would fulfill the cultural needs of an ambitious and self-respecting Canada and be a part of its taking its rightful place among the most advanced nations of the world.

Turning now to the non-scientific (although not clearly separable) phases of his career, it is apparent that the general rule of ebb and flow of fortune affected him, but to counterbalance troubles, strong friends seemed ever to appear. His father was principal of a private school

in which his mother also taught. "However, this marriage dissolved, and his mother entered the theatrical profession in Mrs. Morrison's Famous Stock Co., Toronto, under the name of Ida Van Cortland. After one season with this company and shortly thereafter, when Percy was six years of age, she met and married Albert Tavernier, also an actor, who informally adopted Percy and had him take his name." For some years from 1882 they maintained their own repertoire company which was very successful at first but later, with a change in style of public entertainment, much less so, and they were hard put to make expenses. In consequence, Percy had a very unsettled childhood, at times travelling with the company and at others living in various homes and with different people. From Taverner's biographical notes, we learn that these early travels took him through the eastern circuits from Newfoundland and the Maritime Provinces, through New England and New York south to Charleston and New Orleans. Of the South he recalled the white cotton fields and darkies at the railway stations chewing sugar cane.

Among places of temporary residence, he recorded a theatre home in Halifax; with a family in Brooklyn where was also Georgie Fox, daughter of a then famous circus clown; in a minister's family along the Erie Canal, where he was regarded as a child of the devil and had the lapses of all the other children blamed on him; and of spending summers at Lake George.

Of the kindergarten at Highland Falls he wrote: "This school was in a big, substantial farm mansion in a large grounds of lawn and orchard set well back from the road, with a grove of chestnut trees in front. Many years after on returning from an A. O. U. meeting, I spotted it again at sight. The chestnuts were of course gone [due to a devastating blight] and the elaborate wooden fence and formal gateway had disappeared, but the big boulder that used to be called 'Grandpa's Pebble,' which marked the drive, remained, and the upper windows of the weather-stained house peeped over the hill that separated it from the roadside. One fall, winter, and spring were spent there."

Further schooling was had at Port Huron, Michigan, where for a number of years he found a home with the C. F. Smiths, who treated him as their own, and he went to Miss Coyle's private school, through most of the grades. Similarly at Ann Arbor, he was cared for in the home of Wallace Bliss and attended the eighth grade and high school. Summers were spent at his parents' island home in Lake Muskoka.

Of this period, his sister, Mrs. Ida C. McLeish of Ottawa, writes: "Our summers were very long there in those days for we made a bee-

line for the only home we had as soon as the season closed in spring and stayed until it was time to start rehearsals in the fall. A few summers the whole company were there with us, and they used to rehearse there for the coming season. The log-book has Percy's name entered almost every summer from 1886 to 1904." Among visitors in the latter year were B. H. Swales and wife. "The summer of '98 Percy did quite a lot of photographic work among the tourists."

While still spending the winters at Port Huron and before graduating from high school, he went to Guelph, Ontario, where his stepfather had taken over the management of the new Royal Opera House. Percy promptly discovered that he was no business man and found that the birds of Guelph interested him far more than the theatre. After some two years of this venture (1894–1897), he turned to other activities, including bird stuffing, also finishing for an itinerant photographer. Eventually, by way of learning a dependable vocation, he returned to Port Huron, Michigan, where he took a correspondence course in architecture and worked in the office of George L. Harvey. To eke out his pittance salary ($3.00 a week), odd jobs of taxidermy and night-ferrying by rowboat across the St. Clair River were resorted to. Percy took over during closed hours of the regular ferry, threading a perilous way between the numerous great freighters. The fare was 25 cents and circus night was a grand harvest time. Drunks who had missed the large boat were regular, though possibly dangerous, customers. Percy kept a cudgel handy for subduing these gentry if necessary.

After about two or three years of this phase of the Port Huron life, Taverner joined his mother and sister in Chicago. The mother (who was a survivor of the great Chicago fire of 1871) had retired from the stage about 1898 or 1899, and was engaged in organizational work for a fraternal insurance company. Hoyes Lloyd tells me that early portraits show her as very beautiful and adds that she was a talented and strong character. She and Percy enjoyed a complete companionship and were devoted to each other.

The flavor of life in these years, before ornithology became the acknowledged major interest, may be gleaned from reminiscences kindly sent me by Mrs. McLeish. She writes: "I remember him making up his [bird] specimens when I was quite a little girl. He was twelve when I was born. His room in Port Huron was a veritable magnet for congenial spirits. He did quite a lot of taxidermy . . . to help out his finances, deer heads, dead-game pieces, owls, etc. The trays of eggs and artificial birds' eyes were fascinating to me, and all his explanations of birds and animals, in fact everything. He always seemed an encyclopaedia. In fact he was a great reader of that very work and often had three or four volumes . . . under his bed.

"Later his room in Detroit was lined with bird cases which he made himself. He had quite a large collection . . . Mother and I went on many woods expeditions with him in the outskirts of Chicago and Detroit . . . he brought in everything—lizards, salamanders, snakes, toads, frogs, tadpoles, water beetles, fairy shrimps, etc., etc.—and he used to 'sugar' the trees and bring in moths, butterflies, beetles, bugs, etc. In spring he had cages with cocoons of *Cecropia, Luna, Polyphemus;* we watched them coming out, developing, and mating. In Detroit we had a tame wood-duck . . . and became familiar with its pretty, conversational, *Br-r-r-e-e-e-e-e.* Also we had a pet female sparrow hawk for several years. Percy bought it from some boys for 10 cents; they had cut its wings. She was very tame, liked to be with us, sitting on a shoulder and running her bill around the convolutions of an ear, snuggling right up to the side of the head . . . Falco's wing feathers finally grew but it took several years for her to become fully winged because as the primaries grew out, she . . . used to bite them off.

"Mr. Fleming visited us in Chicago in 1902 . . . and often . . . in Detroit where we were from 1905 to 1911.

"In Chicago Percy had a very severe pneumonia, nearly didn't make it. It was then he grew a beard; the Doctor thought he had better not remove it during the winter and he wore it always thereafter.

"While we were in Chicago Percy took a course of evening classes at the Art Institute the fall of 1903 . . . Wherever we lived we always embraced every opportunity to see plays or hear music . . . We used to study about these things both before and after we went and it was always a marvel to me what Percy knew . . . We had a passion for the Wagner operas and their dramatic stories."

Percy had wonderful versatility: "it always seemed to me he could *do* or *make anything*. His hands were skilled in every craft—metal work, carpentry, book binding, photography, and a hundred other arts. He was wonderfully adept at small boat handling, could literally sail anything. When in his early 'teens, he converted a little 14-foot row-boat of his into a sail-boat, decked it over, put in a center board, called it 'The Coffin,' and went out in it in any gale. This was at our early home in Muskoka.

"We were together so much, practically all my life until we were both married, within two weeks, and even then lived in the same city. His wonderful care of mother and me, his lovely humor, his passion for music and literature, drama and art, his brilliant mind and retentive memory—it is all a treasure not to be forgotten."

These tributes are not to be discounted as the enthusiasm of a

sister, for the longer one knew Taverner the more one came to realize that he was indeed a man of many skills and of lovable character. A cheerful and friendly expression is apparent in photographs of Taverner at all ages.

A. E. Porsild adds: "Percy was very fond of music and enjoyed the musical evenings at his house . . . He liked the old-time songs and his memory of them . . . was truly astounding . . . Nothing pleased him more than to have someone at the piano with a volume of 'old-timers.' He knew the words of all of them and if no one was around, loved to sing . . . Rock gardening, photography, and book-binding were his principal hobbies." I may contribute that for years he made his own Christmas cards, some being drawings carrying an original idea and others photographs, usually of birds.

Hoyes Lloyd, who was with Percy in western field work in 1920 and 1921, writes of his mechanical ability in camp, "where he could improvise and make do with the very minimum of material and tools. I have seen a hand-made forearm for a shot-gun which he whittled and a home-made stock for a collecting pistol. He could make anything! and his work-bench was a favorite spot . . . Metal seemed his strong point and whenever Percy disappeared in a strange town, he could usually be found at the nearest tinsmith's. In art work he was at home with camera, pencil, brush, or clay . . . He was a good camp cook and could prepare a grand collation . . . Another artistic attainment showed up in his ability as a gardener. His flower garden was always a delight and always included rarities . . . Don't forget 'Hyla' the cottage at Blue Sea Lake which he built with his two hands."

Arthur Kellett, a highly skilled gardener and photographer, kindly writes of Taverner in these roles: "During my long acquaintanceship and friendship with Taverner, his extraordinary versatility was always a matter for wonderment. There seemed to be little that he could not do with a real measure of success, and with the introduction of considerable originality. This was the case in both his gardening and photographic efforts.

"If I remember correctly, it was in 1915 that he constructed in his garden the first lily pool in any private garden in the Ottawa district. This pool, of quite pretentious dimensions, in succeeding years became the home of many locally unknown aquatics including *Nelumbo lutea*, which he collected in its native haunts in the Point Pelee district. He also grew with much success several of the colored water-lily hybrids of exotic parentage, being without doubt the first to introduce them into cultivation in this part of Ontario. Native plants were of particular appeal to him, and under his care many woodland species were

made to thrive in happy association in a corner of his garden which was devoted solely to such subjects. Plants of other habitats which he had collected during his ornithological expeditions, in distant parts of the Dominion, became established in other parts of his garden. The result was a garden of many interests and surprises as well as one of artistic planning.

"His interest in photography I should say lay chiefly in its value as a means of record, but in its utilitarian use he was ever conscious of artistic and technical merit. In his later years declining health and strength reduced but by no means stopped his photographic activities. Turning from birds to the less trying task of photographing the local flora, he produced many delightful plant portraits, for his eye for viewpoint was sure, and good composition, limited only by the nature of the subject itself, invariably added to his photographs a quality which lifted them out of the mere record category.

"In these two activities, as in so many others, his achievements possessed a quality which only one of his appreciation of beauty and fitness could reach."

Taverner's varied accomplishments were much in evidence in connection with the first Canadian meeting of our Union at Ottawa in 1926. The Great Auk and the Auklet (the latter illustrated on Plate 4 of The Auk, 44: opp. p. 74, 1927) were his handiwork as were miniatures of the former provided as place favors at the annual dinner. The illustrated, facetious menu was his doing, he contributed much to The Auklet for which he was given at the dinner a great yellow medallion labelled "Aukleteer," and his book on the 'Birds of Western Canada,' then just published, was distributed gratis to visitors. Through the unstinted efforts of the local Committee and coöperators, the program of the meeting set a new high for A. O. U. gatherings. Though some afterwards met the challenge as at Washington and Charleston, none has included a camp-out such as was made so enjoyable at Blue Sea Lake, Quebec, in 1926.

While Taverner could write well, he did not always take the trouble to do so and he thought it good policy to leave something for editors to correct. It was characteristic of him after getting a new typewriter to complain that it didn't spell any better than the old one. One of the typographical errors that editors did not eliminate was "Lord and Lady Algy" (Birds of Eastern Canada: 284, 1919). A disgruntled compositor slipped in "Algy" from a play then current, with no reference, probably, to Percy's middle name. "Lord and Lady" is a northeast-coast folk name for the Harlequin Duck. As an example of sustained good writing, his article on 'The Yellow-breasted Chat' in

Bird-Lore (1906) may be cited. Scattered in his bird books are many well-turned passages and it is interesting to note that like certain earlier, well-known, ornithological writers, he also was particularly inspired by the Catbird (Birds of Canada: 324–325, 1934). The last two sentences of this essay are: "When left to its own devices and at ease, the Catbird often hunches up and fluffs its feathers in a shady retreat within hearing distance of its incubating mate and carries on a long, low-toned monologue, every tone soft and throaty and altogether delicious. What it says then is impossible to translate and probably is none of our business."

Wilfrid Eggleston is authority for the statement that such descriptive writing was eliminated by the "powers that were" from the manuscript of the 1919 'Birds of Eastern Canada.' The wide popular demand for the book surprised them, however, and as it continued beyond their expectation, the author was given a free hand to put what he desired in the 'Birds of Western Canada' and the later 'Birds of Canada.' (Winnipeg Free Press, June 7, 1947.)

Considerable power of language is discernible in some of his field letters. From one of July, 1914, about his experiences on Bonaventure Island: "It was the bird ledges, however, that aroused our enthusiasm . . . To crawl to the crest of the cliff . . . and see a thousand gannets —birds as large as geese—pure white with cream heads and jet black pinions . . . sitting unconcernedly on their nests almost within hand's reach—and ledge after ledge of them down three or four hundred feet . . . and for every bird on the nest there was another in the air sailing in a great circle past the cliff, some so close that one could see the color of their eyes, and others lower down, until the air was full of them—all passing, passing, passing, in the same direction out over the sea and back again like the rim of a great wheel or of a whirlwind bearing a cloud of snowflakes."

A keen sense of humor seemed to have been a life-long trait of Taverner. Among his earliest published ornithological writings are some labelled as humorous and he was ever a prominent contributor to 'The Auklet,' an irregular magazine of A. O. U. *facetiae.* Flourishing in the same era was an informal association of kindred spirits known as 'The Appleton Club.' Although sponsored by no temperance society, its libations were moderate and its attractions were friendship and good fellowship. At the meetings, usually in hotel rooms, Taverner's favorite seat was back against the wall and legs stretched out on the floor, where he alternated as an animated raconteur and an encouraging auditor. In verses written in memory of 'The Appleton Club,' a member had Taverner especially in mind when he said:

"While gay at times with quip or story,
Noblesse is too a vital part,
And can a word of friendship proffer
That finds its way straight to the heart."

Bearing on his personal habits, I may mention that Taverner frequently asserted: "I am a carnivorous animal," and he referred to vegetables in general as "caterpillar food." As to physique, he was 6 feet 2 inches tall and in his prime weighed from 170 to 180 pounds.

Taverner had a strong interest in current affairs and often was so moved that he felt impelled to write a "letter to the editor." Topics of some of these essays were 'Vivisection,' 'Vaccination,' 'Cats,' 'The monetary system,' 'The flag as a symbol,' and 'Democracy betrayed.' In an August, 1941, letter, his prescience was shown in the remark: "Russia may be our ally but she is not our friend." In various communications he expressed doubt of improvement after the war, a view now recognizable as proof of sagacity or of deep knowledge of human nature, or both.

Aside from official travel, previously scheduled, Taverner made several long jaunts for more personal reasons, although museums and scientists were never slighted. One of these in company with his sister in 1927 took him to Victoria and other points in British Columbia, San Francisco, Yosemite National Park, Los Angeles, Tucson, and El Paso. Despite his mechanical ability, Percy would not drive a car, but after their marriage, Mrs. Taverner, a skilled driver, took him on almost daily trips about Ottawa, and in 1932 they went to Percé and Bonaventure Island for further observation and photography of the birds of that sanctuary. In 1937 they went by automobile to the A. O. U. meeting in Charleston, bringing along Mr. and Mrs. Reynold Bray, and later seeing the country and the birds from Okefenokee Swamp, Georgia, to the Florida Keys. In 1939, similarly, an excursion through the Southwest was combined with attendance at the A. O. U. meeting in Berkeley. Whether it was the southern trips or failing vitality that prompted him, he wrote me as early as 1941 that he hoped to live where the winters are "something less than nine months long." And this expression of a hope, frustrated by war-time conditions, was repeated in the last letter I received from him in March, 1947.

In February, 1943, he wrote: "I took a general examination and was ordered to bed. Here I am nearly seven weeks, feeling as well as I ever have." Too strenuous snow shoveling seemed to have been the cause of this heart strain. A heart impairment of long standing

probably dated back to the severe pneumonia of the Chicago period. However, he got to his well-loved summer home at Blue Sea Lake, Quebec, where he "just lazed and read."

On December 27, 1943, when in fair condition, he wrote: "Just got the Saunders Memorial off . . . Hope it is the last of these sad duties I will have to perform. The next probably is on somebody for me. Too bad I cannot see it." [Then I wondered whether I would not be doing just what I have done.]

Toward the end of May, 1944, he reported that he had been laid up again most of the winter and spring, and said: "Now I am allowed to come down stairs but once a day." He again summered at Blue Sea and apologized for not writing, stating: "I got very lazy at the Lake; besides there aren't any words up there." In March, 1945, a letter noted: "No shoveling but I had my usual winter breakdown." That summer there were again no words at Blue Sea Lake. After playing with the idea of going to Florida by trailer or otherwise, he concluded: "I guess we will just crawl into our hole here for the winter and endure it as best as we can, sucking our paws like bears."

In the next two years he was sometimes "laid up" and at others "passively well." However, during this period, "he had many visitors," Mrs. Taverner writes, "whom he enjoyed as keenly as ever, perhaps more so. We had many musical evenings which delighted him and he was always a most gracious host."

On March 10, 1947, in as long, well-conceived, and well-written a letter as I ever received from him, he noted that they had not found a southern retreat, but holed up again, and hoped to break the sequence next fall. Referring to the 1947 A. O. U. meeting planned for Toronto, he wrote: "The gods willing, I certainly hope to attend." In this last letter of our series, extending back to 1905, he ended: "Don't waste any sympathy on me, I am in peaceful and comfortable vegetation without pain or ache, perhaps sometime I will even like being an oyster." Two months later he died.

Throughout his retirement he worked away whenever he could at a 'Manual of Water Birds and Game Birds.' In September, 1942, he wrote: "I have been preparing it for some 20 years and it has just escaped publication by the Department of Mines and Resources by a hair, several times. Lately I completely rewrote it and brought it up to date in a thousand, letter-size, pages and 500 line figures and sketches." In December, 1942, he was still working on it, enlarged the scope by taking in some 50 additional species, and completed his 568th drawing for it.

Revision continued, and by April, 1945, 1,280 manuscript pages plus

50 pages of references marked its growth. In December of that year he wrote: "Just completed a steenth revision of my ms." All of this was rationed activity at the rate of not more than two hours a day. The manuscript was offered to various publishers but war exigencies prevented its acceptance. On one of these journeys it was part of the cargo of a truck that was hijacked, though fortunately the manuscript and illustrations were recovered intact. The work is again being considered for publication by the Canadian National Museum. It certainly should be put in print.

In March, 1945, he told me: "Have arranged for my library to go to the Quebec Provincial Museum where I hope some day it will be used . . . At least it will be kept together as a Canadian reference collection." His ornithological journals (18 volumes), his correspondence with Fleming, and letters written to his mother and sister from the field are deposited in the Royal Ontario Museum of Zoology at Toronto.

A defect in speech—stammering—doubtless kept Taverner from becoming more prominent than he was in the organizations to which he belonged. He seldom read a paper or took part in discussion and as a rule refused all advancement that tended toward a presiding officership; he was, however, President of the Ottawa Field Naturalists' Club in 1938. Yet in smaller groups, where all were familiar, he spoke when the spirit moved him and usually to good effect. One old acquaintance said that what Percy had to say was always worth waiting for. Hoyes Lloyd assures me that this speech impediment was much less noticeable in field and camp life where "he whiled away many a dull hour by singing opera to me. He probably knew them all!" Among friends, the difficulty was ignored and Taverner seemed in no way to be made self-conscious by it. In fact, his entirely unaffected demeanor was one of his special charms—there never was any pose of authority or greatness; the result was ease for all concerned and, therefore, pleasure in his company.

His career exemplifies a type of success which we like to believe is a privilege of the New World, in that character and industry still tell and enable a man to overcome poverty and privation and to reach the heights of his chosen vocation. He was not a great taxonomist, but as a museum builder, he was far ahead of the facilities available to him, and as a popularizer of ornithological knowledge, he was of the first rank. As a human individual, he was both practical and artistic, multi-skilled yet very modest, patient, kindly, and humorous, appreciative of others and greatly appreciated by them. So long as any who knew him survive, his memory will be held in tender recollection.

Biographical Details

Percy Algernon Taverner was born at Guelph, Ontario, Canada, June 10, 1875, to Edwin Fowler and Emily E. [Buckley] Fowler, both of English birth. After this union was dissolved, his mother in 1881 married Albert Taverner or, as the latter spelled the name for stage use, "Tavernier." That form of the surname was used for many years by our subject and his friends (*see* Fleming, Auk, 1901: 33). Later he "unofficially adopted" the name, Taverner, which he used the remainder of his life. "Anyway," he wrote in 1937, "it is the spelling my grandfather used." This grandfather [by adoption], John Taverner, also was of the stage.

Formal education was broken off in high school. He was a student and a practitioner of architecture for some years; Assistant Naturalist and Curator, National Museum of Canada, 1911–1914; Zoologist, 1914–1919; Ornithologist, 1919–1936; Chief, Division of Ornithology, 1936 to 1942, when he retired, as Honorary Curator of Ornithology. He was a member of the Canada Advisory Board on Wildlife Protection; Fellow of the Royal Society of Canada (1935); and member at one time or another of the following scientific organizations: Michigan Ornithological Club (of whose Bulletin he was Associate Editor in 1905); Detroit Academy of Natural Sciences; Wilson Ornithological Club; Cooper Ornithological Club; American Ornithologists' Union (from 1902; elected Member in 1909 and Fellow in 1917; member of the Council for various terms); Ottawa Naturalists Field Club (serving as Ornithological Editor of the Canadian Field-Naturalist, 1912–1942, as President in 1938, and being elected Honorary Member in 1945); and Société Zoologique de Quebec; he was also an Honorary Member of the Linnaean Society of New York and the Brodie Club of Toronto; Colonial Member of the British Ornithologists' Union; and a Mason.

On March 29, 1930, he married Martha Hohly Wiest of Detroit, a talented pianist and teacher of music and an efficient household manager who took care of him, not only in the better years but throughout his decline, with great devotion.

After the series of illnesses, noted in the text, and a slight stroke of apoplexy from which he seemed to be recovering, Taverner died of mesenteric hemorrhage and static pneumonia at Ottawa, Canada, May 9, 1947, and was buried there in Beechwood Cemetery.

Subspecies Named by Taverner

Dendragapus obscurus flemingi, Fleming's Grouse. For J. H. Fleming "in recognition of the value of his ornithological work in Canada." Auk, 31: 385–388, 1914.

Lagopus lagopus leucopterus, White-shafted Ptarmigan. Ann. Rep. Nat. Mus. Canada, 1930 (1932): 87–88.

Passerculus sandwichensis campestris, Prairie Savanna Sparrow. Proc. Biol. Soc. Washington, 45: 204–205, 1932.

Astur atricapillus laingi, Queen Charlotte Goshawk. For "Hamilton M. Laing who has been instrumental in uncovering this form." Condor, 42, 1940, p. 160.

SUBSPECIES NAMED FOR TAVERNER

Spizella taverneri, Timberline Sparrow. Harry S. Swarth and Allan Brooks, Condor, 27: 67–69, 1925, from northwestern British Columbia; now regarded as a subspecies of *Spizella breweri*.

NOTES ON NATURALISTS AND A FEW OTHER INDIVIDUALS MENTIONED

(References are to published biographical information about them)

BAIRD, SPENCER FULLERTON, American zoologist and administrator, 1823–1887; Smithsonian Institute Annual Report 1888 (1890): 703–740; Auk, 4: 273, portrait, 1887; 5: 1–14, 1888; National Cyclopaedia of American Biography, 3: 405–406, portrait, 1893; National Academy of Sciences, Biographical Memoirs, 3: 141–160, 1895; "Spencer Fullerton Baird, a Biography . . .", by William Healey Dall: pp. xvi + 462, (portraits), 1915.

BARROWS, WALTER BRADFORD, American ornithologist and educator, 1855–1923; Auk, 42: 1–14, portrait, 1925.

BARTSCH, PAUL, American zoologist, 1871– . American Men of Science, 7th ed.: 102, 1944.

BRAY, REYNOLD JOCELYN ONSLOW, English ornithologist and explorer, 1911–1938; Auk, 57: 139–140, 1940. His wife Gillian Margaret Warren Butler.

BROCK, REGINALD WALTER, Canadian geologist and administrator, 1874–1935; Proc. Geol. Soc. America: 157–170, 1935.

BROOKS, ALLAN, British ornithologist and artist, 1869–1946; Condor, 48: 153, portrait and reproductions of eight of his paintings, 1946; Auk, 64: 430–444, portrait, 1947.

COLE, LEON JACOB, American zoologist, 1877– . American Men of Science, 7th ed.: 340, 1944.

COVERT, ADOLPHE BOUCARD, Taxidermist and writer on natural history subjects, 1853–1919. Portrait in Bulletin of the Michigan Ornithological Club, 4 (1): 18, March, 1903.

EGGLESTON, WILFRID, Canadian writer, 1901– .

FLEMING, JAMES HENRY, Canadian ornithologist, 1872–1940. Fleming Memorial Papers, Brodie Club, Toronto, 30 pp., mimeographed, 1940; Auk, 58: 1–12, portrait, 1941; Canadian Field-Naturalist, 55: 63–64, portrait, 1941.

HENNESSEY, FRANK CHARLES, Canadian naturalist and artist, 1893–1941.

JOHNSON, CLAUDE EDWARD, Canadian museum artist, 1886– .

KLUGH, ALFRED BROOKER, Canadian naturalist and educator, 1882–1932; Canadian Field-Naturalist, 46 (7): 170, October, 1932; "Alfred Brooker Klugh—A bibliography," by J. R. Dymond and C. C. Toner, Suppl. 1, Bull. Eastern Ontario Fish and Game Protective Association, March 1936.

LAING, HAMILTON MACK, Canadian naturalist and author, 1883– .

Lambe, William Geoffrey A., Canadian broker and amateur ornithologist, 1862–1941; Taverner's best friend in his early years at Toronto.

Lloyd, Hoyes, Canadian ornithologist and administrator, 1888– .

Macoun, James Melville, Canadian botanist and ornithologist, 1863–1920; Auk, 37, 1920: 346; Canadian Field-Naturalist, 34: 38–40, portrait, 1920.

Macoun, John, Canadian botanist and ornithologist, 1832–1920; Canadian Field-Naturalist, 34: 110–114, portrait, 1920.

Mearns, Edward Alexander, U. S. Army Surgeon, naturalist and explorer, 1856–1916, Auk, 35: 1–18, portrait, 1918.

Porsild, Alf Erling, Danish-Canadian botanist, 1901– ; American Men of Science, 7th ed.: 1409, 1944.

Pray, George Raymond, American physician and amateur ornithologist, 1877– .

Rand, Austin Loomis, Canadian-American zoologist, 1905– ; American Men of Science, 7th ed.: 1439, 1944.

Ruthven, Alexander Grant, American zoologist and administrator, 1882– ; American Men of Science, 7th ed.: 1531, 1944.

Saunders, William Edward, Canadian naturalist, 1861–1943; Auk, 61: 345–351, portrait, 1944; Canadian Field-Naturalist, 57: 99–100, portrait, 1943.

Seton, Ernest Thompson, Canadian-American naturalist, artist, and author, 1860–1946; National Cyclopaedia of American Biography, 9: 56, portrait, 1907; "Trail of an artist-naturalist" (Autobiography), portraits, 1940.

Spreadborough, William, Canadian collector, 1856–1931; Canadian Field-Naturalist, 47: 39–41, portrait, 1933.

Stoddard, Herbert Lee, American ornithologist and wildlife manager, 1889– .

Swales, Bradshaw Hall, American ornithologist, 1875–1928; Auk, 45: 321–329, portrait, 1928.

Swarth, Harry Schelwaldt, American ornithologist, 1878–1935; Auk, 54: 127–134, portrait, 1937; Condor, 38: 155–168, portraits, 1936.

Walker, Bryant, American lawyer and conchologist, 1856–1936. Annotated bibliography and portrait in "The scientific writings of Bryant Walker," Occasional Papers of the Museum of Zoology, University of Michigan, 402: 28 pp., 1939.

Wallace, James S., Canadian businessman and naturalist, 1868–1922. Obituary by W. E. Saunders in Canadian Field-Naturalist, 37: 74–75, 1923; also in The Toronto Globe, July 25 and 27, 1922, the latter by J. H. Fleming.

Wolcott, Robert Henry, American ornithologist and educator, 1868–1934; Auk, 52: 130–131, 1935; Wilson Bull., 47: 45–49, portrait, 1935.

Sources of Information

A biographical outline (edited by the family) and a bibliography (incomplete) prepared by Taverner in 1942 (copy supplied by James L. Baillie, Jr.).

Biographical sketches in the Toronto "Saturday Night," February 1, 1936 and November 4, 1944, and the Toronto Evening Telegram, June 17, 1947.

Appreciations of Taverner's books from the Winnipeg "Free Press," June 7, and 20, 1947.

Obituaries from the Ottawa Evening Journal and Ottawa Citizen, May 10, 1947.

Letters from the field, 1914–1928, to his mother and sister (kindly furnished by the latter).

Personal correspondence with: P. A. Taverner, 1905–1947; J. H. Fleming, 1916–1939; and Hoyes Lloyd, 1922 to date.

Acknowledgments

Information on Taverner and aid in checking biographical details are gratefully acknowledged primarily from Ida C. McLeish (*nee* Tavernier); Mrs. Martha H. W. Taverner, Hoyes Lloyd, and James L. Baillie, Jr., but also from: F. J. Alcock, C. H. D. Clarke, Leon J. Cole, Isabel C. Dean, A. G. Lawrence, Clyde L. Patch, A. E. Porsild, George R. Pray, A. L. Rand, Ruth A. Rouse, L. L. Snyder, and John T. Zimmer.

THE SIXTY-FIFTH STATED MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION

BY OLIN SEWALL PETTINGILL, JR., SECRETARY

At the cordial invitation of the Royal Ontario Museum, the 1947 meeting of the American Ornithologists' Union was held in Toronto on September 8–12, 1947. This was the fourth meeting in Canada and the second in Toronto. Headquarters were in the Royal York Hotel where business sessions took place on Monday, September 8. All public sessions were held in the Museum on Tuesday, Wednesday, and Thursday. On Friday, September 12, a field trip was taken to Toronto Island.

Business Sessions

The business sessions were as follows: (1) First Session of the Council, Monday, 10:05 a. m. to 12:25 p. m. Number in attendance, 15. (2) Second Session of the Council, Monday, 2:00 to 4:10 p. m. Number in attendance, 15. (3) Meeting of the Fellows, Monday, 4:15 to 5:20 p. m. Number in attendance, 18. (4) Meeting of the Fellows and Members, Monday, 8:20 to 11:45 p. m. Number of Fellows present, 19; number of Members present, 27. (5) Third Session of the Council, Wednesday, 10:15 to 11:40 a. m., in the Museum. Number in attendance, 16.

Reports of Officers. The Secretary reported that the total number of members of the Union, including both Honorary and Corresponding Fellows, was 2,138. This figure, when broken down into the various classes of membership, is as follows: Fellows, 48; Fellows Emeriti, 2; Honorary Fellows, 14; Corresponding Fellows, 64; Members, 137; Associates, 1,873. Due largely to the efforts of the Committee for the Nomination of Associates under the chairmanship of Dr. Leonard Wing, 570 persons were proposed for associate membership. Their election will bring the total membership to a record-breaking figure of 2,708. Resignations during the year numbered 31. Notice of the following deaths were received: Fellows: Wilfred H. Osgood, Percy A. Taverner; Corresponding Fellow: Friedrich Carl Herman von Lucanus; Members: William Lloyd Baily, Joseph Warren Jacobs, Ernest Thompson Seton; Associates: William M. Walker, Arden E. Page, R. M. Barnes, J. Alden Loring, M. J. Magee, Mrs. Ella M. Ormsby Marshall, Walter Cleveland Henderson.

The Treasurer, in his report ending August 28, 1947, showed total receipts of $12,725.69 and disbursements of $10,676.64 with a bancela on hand of $2,049.05.

Costs of publishing 'The Auk' were indicated by the Editor to have increased about 20%. Arrangement of the next Ten-Year Index which was begun by the late George Willett is being ably carried on by Mr. Charles K. Nichols.

Reports of Committees. Dr. Alexander Wetmore, Chairman of the Committee on Classification and Nomenclature of North American Birds, stated that a complete revision of the Check-List is under way. Almost 160 pages of manuscript are already in revised form; by 1949, the manuscript should be ready for publication.

Dr. Frank A. Pitelka, Chairman of the Committee on Education, explained how his newly formed committee is proceeding to locate worthy candidates for free associate memberships and showed samples of mimeographed forms being used for that purpose. The Committee is soliciting applications "particularly from college and university students actively engaged in coursework or research in ornithology." The Educational Fund is yielding, he said, a sum sufficient to permit the awarding of 12 memberships.

Dr. Leonard Wing, Chairman of the Committee for the Nomination of Associates, presented a thorough mimeographed summarization of his committee's work. Approximately 3,500 persons were solicited for membership and 300 accepted. About 50 persons accepted membership as a result of being nominated by members of the Union.

The Report of the Committee on Bird Protection was read by Dr. Jean M. Linsdale, Chairman, at the public session on Tuesday afternoon and is published in this number of 'The Auk.'

Gift. The Union received notice of a gift of $500.00 from the estate of the late Wilfred H. Osgood. When this sum becomes available, it will be placed in the General Endowment Fund.

The Award of the Brewster Medal. By action of the Council, the Brewster Medal was awarded to Mr. Francis H. Kortright for his book, "The Ducks, Geese, and Swans of North America," published in 1942.

Next Stated Meeting. Fellows and Members, meeting jointly, accepted the invitation of the Nebraska Ornithologists' Union to hold the Sixty-sixth Stated Meeting in Omaha. The President named Dr. R. Allyn Moser, Chairman of the Local Committee on Arrangements.

Amendments to the By-Laws. Four new amendments proposed at the Sixty-fourth Stated Meeting at Urbana-Champaign, Illinois, were given final approval by the Fellows. The amendments, now adopted, are listed below:

1. Article I, Section 2, shall be revised to read as follows: "Fellows shall be citizens or residents of the United States, Canada, or Newfoundland. They shall be limited in number to fifty individuals of not more than sixty-five years of age, without prejudice to the number, status, or election of older Fellows."
2. Article I, Section 6, shall be revised to read as follows: "Members, at the time of their election, shall be residents or citizens of the United States, Canada, or Newfoundland, and shall be limited to two hundred in number."
3. In Article IV, Section 6, the statement that "not more than ten members shall be elected in any one year" shall be revised to read "not more than fifteen Members shall be elected in any one year."
4. To Article V, Section 7, the following statement shall be added: "Any Fellow, Member, or Associate of the Union who becomes a Patron is exempt from annual dues."

Miscellaneous Matters. The Council granted the Editor authority to charge authors for plates except those used with memorials of Fellows. This procedure will assist in offsetting increased costs of publishing 'The Auk.'

ELECTION OF OFFICERS

The election of Officers for 1948 resulted in the re-election of the officers of the preceding year as follows: *President*, Hoyes Lloyd; *Vice-Presidents*, Robert Cushman Murphy and Josselyn Van Tyne; *Secretary*, Olin Sewall Pettingill, Jr.; *Treasurer*, Frederick C. Lincoln; *Members of the Council* (in addition to officers and ex-presidents), John T. Emlen, Jr., Alden H. Miller, and Herbert L. Stoddard.

The Council re-elected John T. Zimmer, *Editor of 'The Auk'*; Julian K. Potter (Chairman), R. M. deSchauensee, and Ludlow Griscom, *Investing Trustees;* Frederick C. Lincoln (Chairman), R. M. deSchauensee, Ludlow Griscom, Hoyes Lloyd, and Olin Sewall Pettingill, Jr., *Members of the Finance Committee.*

ELECTION OF FELLOWS, MEMBERS, AND ASSOCIATES

CORRESPONDING FELLOW—1

Lancelot Eric Richdale, Dunedin, New Zealand.

FELLOWS—5

John Warren Aldrich, Washington, D. C.
Francis Henry Allen, West Roxbury, Massachusetts.
Henry Boardman Conover, Chicago, Illinois.
Olin Sewall Pettingill, Jr., Northfield, Minnesota.
Lester Lynne Snyder, Toronto, Ontario.

MEMBERS—15

Mrs. Elsa Guerdrum Allen, Ithaca, New York.
Frank Bellrose, Jr., Havana, Illinois.
Herbert William Brandt, Cleveland, Ohio.
Charles Henry Douglas Clarke, Toronto, Ontario.
Donald Redfield Griffin, Ithaca, New York.
Charles Russell Mason, Boston, Massachusetts.
Burt Leavelle Monroe, Anchorage, Kentucky.
Reuben Allyn Moser, Omaha, Nebraska.
Ralph Simon Palmer, Poughkeepsie, New York.
Harold Seymour Peters, Charleston, South Carolina.
Richard Hooper Pough, New York, New York.
George Bradford Saunders, Denver, Colorado.
Gustav Swanson, Washington, D. C.
James Taylor Tanner, Knoxville, Tennessee.
Lewis McIver Terrill, Westmount, Quebec.

ASSOCIATES—570

The names of all Associates elected will appear in the membership roll to be published in the forthcoming July number of 'The Auk.'

ATTENDANCE

Attendance at the meeting showed a total of 163 members, composed of 22 Fellows, 32 Members, and 109 Associates. Represented were 17 states and the District of Columbia, 4 provinces of Canada, and Chile. About 160 guests were present, bringing the total registration to approximately 323.

FELLOWS, MEMBERS, AND ASSOCIATES PRESENT

PATRONS:—Hoyes Lloyd, Mrs. Dayton Stoner.

FELLOWS:—John W. Aldrich, Arthur A. Allen, James P. Chapin, Herbert Friedmann, Ludlow Griscom, Lawrence E. Hicks, S. Charles Kendeigh, Frederick C. Lincoln, Jean M. Linsdale, Hoyes Lloyd, Robert Cushman Murphy, Harry C. Oberholser, Olin Sewall Pettingill, Jr., A. L. Rand, L. L. Snyder, Herbert L. Stoddard, G. M. Sutton, W. E. Clyde Todd, A. J. van Rossem, Josselyn Van Tyne, Alexander Wetmore, John T. Zimmer.

MEMBERS:—Mrs. Elsa G. Allen, Dean Amadon, R. M. Anderson, James L. Baillie, Jr., Emmet R. Blake, Herbert W. Brandt, W. J. Breckenridge, Maurice Brooks, Thomas D. Burleigh, C. H. D. Clarke, David E. Davis, John T. Emlen, Jr., F. N. Hamerstrom, Jr., Harry W. Hann, Francis L. Jaques, Peter Paul Kellogg, F. H. Kortright, R. Allyn Moser, Roger T. Peterson, Frank A. Pitelka, Richard H. Pough, S. Dillon Ripley, James Savage, A. W. Schorger, T. M. Shortt, Wendell P. Smith, Alexander Sprunt, Jr., Gustav Swanson, Milton B. Trautman, George J. Wallace, Leonard Wing, Albert Wolfson.

ASSOCIATES:

Alberta, 1—F. W. Munro, Arvilla.

California, 3—Herbert O. Hill, Berkeley; Mrs. Junea W. Kelly, Alameda; Mrs. Ethel E. Richardson, Berkeley.

Chile, 1—D. S. Bullock, Angol.

District of Columbia, 1—Malcolm Davis, Washington.

Illinois, 8—Karl E. Bartel, Blue Island; William J. Beecher, Chicago; Harold C. Hanson, Urbana; Naomi M. Hawkins, Alma; Mrs. Ethel M. Henwood, Urbana; Mrs. Hermon D. Smith, Chicago; Mrs. R. R. Snapp, Urbana; Melvin A. Traylor, Chicago.

Indiana, 1—John W. Baechle, Collegeville.

Iowa, 1—J. Harold Ennis, Mt. Vernon.

Maine, 1—Edward F. Dana, Portland.

Maryland, 2—Eleanor G. Cooley, Berwyn; Chandler S. Robbins, Laurel.

Massachusetts, 2—D. C. Alexander, Boston; Rosario Mazzeo, Cambridge.

Michigan, 11—B. W. Baker, Marne; H. Lewis Batts, Jr., Ann Arbor; Mrs. Elizabeth B. Beard, Plymouth; W. N. Davey, Ann Arbor; Mrs. Edith K. Frey, Jackson; Harold M. Hill, Ann Arbor; Douglas A. James, Huntington Woods; Agnes Kugel, Grand Rapids; Robert M. Mengel, Ann Arbor; Jeanne E. Moore, Ann Arbor; Max M. Peet, Ann Arbor.

Minnesota, 2—Byron E. Harrell, St. Paul; D. W. Warner, Minneapolis.

Nebraska, 1—Mrs. R. Allyn Moser, Omaha.

New Brunswick, 2—Reid McManus, Jr., Memramcook; W. Austin Squires, Saint John.

New Jersey, 1—Mrs. Herbert E. Carnes, Tenafly.

New York, 21—Harold H. Axtell, Buffalo; John H. Baker, New York; Mrs. Ruth T. Chapin, New York; D. M. Cooper, Baldwin; Stephen W. Eaton, Geneva; Hazel R. Ellis, Keuka Park; Lawrence I. Grinnell, Ithaca; Mrs. Sally F. Hoyt, Ithaca; Fred T. Hall, Rochester; Ward Klepfer, Kenmore; Harold D. Mitchell, Buffalo; Mrs. Robert Cushman Murphy, New York; Bernard Nathan, Buffalo; Theodore Nelson, New York; Kenneth C. Parkes, Ithaca; Minnie B. Scotland, Cohoes; Mrs. Dayton Stoner, Albany; Mrs. Herbert A. Hickman, Buffalo; Robert D. Weigel, Buffalo.

North Carolina, 1—Mrs. O. F. Jensen, Chapel Hill.

Ohio, 1—Ralph W. Dexter, Kent.

Ontario, 38—C. L. Broley, Delta; William H. Carrick, Toronto; F. S. Cook, Toronto; O. E. Devitt, Toronto; J. A. Eyre, Toronto; J. Bruce Falls, Toronto; C. David Fowle, Toronto; W. Earl Godfrey, Ottawa; W. W. H. Gunn, Toronto; Jessie V. Hambleton, Toronto; Paul Harrington, Toronto; Fred M. Helleiner, Toronto; H. Roy Ivor, Erindale; Mary F. Jackson, Toronto; Mrs. L. E. Jaquith, Toronto; J. E. Keays, London; Howard H. Krug, Chesley; R. G. Lanning, Toronto; Mrs. Louise de Kiriline Lawrence, Rutherglen; A. H. Lawrie, Toronto; Mrs. Hoyes Lloyd, Ottawa; Lucie F. McDougall, Toronto; Anne Merrill, Toronto; D. S. Miller, Toronto; Mrs. Osborne Mitchell, Streetsville; George W. North, Hamilton; A. A. Outram, Leaside; F. G. Roberts, Toronto; R. J. Rutter, Toronto; R. M. Saunders, Toronto; Douglas E. Scovell, Toronto; Mrs. James A. Selby, Fonthill; R. W. Sheppard, Niagara Falls; William W. Smith, Toronto; Mrs. Doris H. Speirs, Toronto; J. Murray Speirs, Toronto; R. D. Ussher, King; J. David West, Toronto.

Pennsylvania, 2—Harold Bacon Wood, Harrisburg; Merrill Wood, State College.

Quebec, 3—Fred H. Glenny, Messines; Alan R. Lepingwell, Montreal; G. G. Ommanney, Wingland's, Hudson Heights.

South Carolina, 2—E. Milby Burton, Charleston; E. B. Chamberlain, Charleston.

Wisconsin, 3—I. O. Buss, Madison; Cleveland Grant, Mineral Point; Clarence S. Jung, Milwaukee.

PUBLIC SESSIONS

Six public sessions, held in the theatre of the Museum, featured the reading of papers which are listed below in the order presented. Papers marked with an asterisk (*) were illustrated by lantern slides; those with two asterisks (**), by motion pictures.

TUESDAY MORNING SESSION

Welcome by MR. ROBERT FENNELL, K.C., Chairman, Board of Trustees, Royal Ontario Museum.

Welcome by PROFESSOR J. R. DYMOND, Director, Royal Ontario Museum of Zoology.

Response on behalf of the American Ornithologists' Union.

Roll call of Fellows and Members, Reports of the Business Meetings, Announcement of the Result of Elections and Award of the Brewster Medal.

1. The Status of Far Eastern Bird Collections and Prospects for the Future. S. DILLON RIPLEY, Peabody Museum of Natural History, New Haven, Connecticut.
2. *Hybridism among the Paradise Flycatchers of Africa. JAMES P. CHAPIN, American Museum of Natural History, New York City.
3. Studies of New World Redpolls. LUDLOW GRISCOM, Museum of Comparative Zoölogy, Cambridge, Massachusetts.

TUESDAY AFTERNOON SESSION

4. *Birds of the Virgin Palouse Prairie. LEONARD WING, State College of Washington, Pullman, Washington.
5. *Comments of Systematics and the Distribution of Dowitchers. FRANK A. PITELKA, Museum of Vertebrate Zoology, Berkeley, California.
6. *Adaptations to Food Type in the Passerine Bill. WILLIAM J. BEECHER, Chicago Natural History Museum, Chicago, Illinois.
7. Report of the A. O. U. Committee on Bird Protection for 1947. JEAN M. LINSDALE, Monterey, California.
8. Problem in Continental Waterfowl Inventory. GUSTAV SWANSON, U. S. Fish and Wildlife Service, Chicago, Illinois.
9. The Rare Birds of New Caledonia and Factors Involved in Their Extermination. DWAIN WILLARD WARNER, University of Minnesota, Minneapolis, Minnesota.
10. Present Status of Some Endemic Birds of Jamaica, B. W. I. HARRISON B. TORDOFF, Museum of Zoology, Ann Arbor, Michigan.
11. *New Light on Bird Photography. ARTHUR A. ALLEN, Laboratory of Ornithology, Cornell University, Ithaca, New York.
12. *Colored Portraits of Common Birds. JOHN W. BAECHLE, St. Joseph's College, Collegeville, Indiana.

WEDNESDAY MORNING SESSION

13. *Observations on Territoriality, Mating Behavior, and Nesting of the Chimney Swift. RALPH W. DEXTER, Kent State University, Kent, Ohio.
14. North American Bird Migrants in Chile. D. S. BULLOCK, Angol, Chile.
15. The Barometric Pressure-Pattern which Stimulates Spring Migration into New England. AARON MOORE BAGG, Holyoke, Massachusetts.

16. *Body Weight and Fat Deposition in Relation to Spring Migration in the White-throated Sparrow. ALBERT WOLFSON, Northwestern University, Evanston, Illinois.
17. *Effect of Temperature on Energy Resources of Birds. S. CHARLES KENDEIGH, University of Illinois, Champaign, Illinois.
18. Biotic Zonation in the Unglaciated Appalachian Region. MAURICE BROOKS, West Virginia University, Morgantown, West Virginia.

WEDNESDAY AFTERNOON SESSION

19. *The Effects of Artificial Lakes on Nebraska Bird Life. R. ALLYN MOSER, Omaha, Nebraska.
20. *Geographic Contacts between Great Basin and Sierra Nevadan Scrub Jays. FRANK A. PITELKA, Museum of Vertebrate Zoology, Berkeley, California.
21. *Extension of the Breeding Range of Herring and Ring-billed Gulls to Eastern Lake Erie. HAROLD D. MITCHELL, Buffalo, New York.
22. Observations on a Bird Population. JEAN M. LINSDALE, Monterey, California.
23. *The Bird Population of an Aspen Association. DOUGLAS A. JAMES, University of Michigan Biological Station, Cheboygan, Michigan.
24. *Breeding Bird Populations in the Spruce Region of the Central Appalachians. JOHN W. ALDRICH AND ROBERT E. STEWART, U. S. Fish and Wildlife Service, Washington, D. C.
25. *Effects on Bird Population of DDT Applied to Scrub Forest. CHANDLER S. ROBBINS, ROBERT E. STEWART, and MARTIN KARPLUS, U. S. Fish and Wildlife Service, Laurel, Maryland.
26. *Differentiation between Barrow's and American Golden-eyes by X-ray of the Skulls. MAX M. PEET, Ann Arbor, Michigan.
27. Some Problems Involved in Preparing a Guide to Bird Finding. OLIN SEWALL PETTINGILL, JR., Carleton College, Northfield, Minnesota, and University of Michigan Biological Station, Cheboygan, Michigan.
28. *Darién Travelog, 1947. ALEXANDER WETMORE, Smithsonian Institution, Washington, D. C.

THURSDAY MORNING SESSION

29. Aristotle's Studies of Birds. ELSA G. ALLEN, Ithaca, New York.
30. *Sex Recognition in the Valley Quail. JOHN T. EMLEN, JR., University of Wisconsin, Madison, Wisconsin.
31. Sexual Behaviour of Intersexual Domestic Fowl. DAVID E. DAVIS, Johns Hopkins School of Hygiene and Public Health, Baltimore, Maryland.
32. **Birds under Control. H. ROY IVOR, Erindale, Ontario.
33. Progress in Building a Library of Natural History Sounds—A Report from the Albert R. Brand Sound Foundation. PETER PAUL KELLOGG, Laboratory of Ornithology, Cornell University, Ithaca, New York.
34. **Observations on the California Condor. TELFORD H. WORK, San Francisco, California, and HAROLD M. HILL, Ann Arbor, Michigan.
35. *Further Studies of the Pileated Woodpecker. J. SOUTHGATE Y. HOYT, Laboratory of Ornithology, Cornell University, Ithaca, New York.

THURSDAY AFTERNOON SESSION

36. *Four Weeks with a Hudsonian Godwit's Nest at Churchill. HAZEL R. ELLIS, Keuka College, Keuka Park, New York.

37. Some Observations on the Life History of the Goldfinch. H. LEWIS BATTS, JR., University of Michigan Biological Station, Cheboygan, Michigan.
38. *The Courtship Display of the Emperor Penguin. MALCOLM DAVIS, National Zoological Park, Washington, D. C.
39. Young Dippers Learn to Feed. HARRY W. HANN, University of Michigan, Ann Arbor, Michigan.
40. *Some Observations on the Territorial Behavior of the Ruffed Grouse. C. DAVID FOWLE, Ontario Department of Lands and Forests, Algonquin Park, Ontario.
41. *Observations on the Food and Behavior of a Family of Cooper's Hawks. ARTHUR A. ALLEN, Laboratory of Ornithology, Cornell University, Ithaca, New York.
42. Nesting Territories of Wood Warblers (*Parulidae*). JOSSELYN VAN TYNE, Museum of Zoology, Ann Arbor, Michigan, and HAROLD M. MAYFIELD, Toledo, Ohio.
43. The Nest of *Nannorchilus leucogaster*. GEORGE MIKSCH SUTTON, Museum of Zoology, Ann Arbor, Michigan.

SOCIAL EVENTS

A complimentary dinner for the Fellows was given by the Local Committee on Monday evening at the Royal York Hotel.

On Tuesday evening an informal reception was held in honor of the Union by the Board of Trustees of the Museum. It was attended by 240 members and guests who had opportunity to meet their hosts and to inspect the various exhibit halls

The Annual Dinner at the Royal York Hotel on Wednesday evening was attended by 243 members and guests. The dinner was followed with delightful entertainment by the Bell Singers and a magician, Mr. E. S. Covell of Toronto.

On Thursday afternoon, Mrs. J. R. Dymond, Mrs. J. H. Fleming, and the wives of Local Committee members were hostesses at a tea in the Museum Garden for wives of members and other attending ladies.

Members of the Union enjoyed a field trip on Friday. Taking the city ferry from the mainland to Toronto Island, 80 members and guests walked leisurely around the western end of the Island, arriving at the Royal Canadian Yacht Club at 1:00 p. m. Here they were joined by other members and guests, 105 persons sitting down to a complimentary luncheon provided by the Local Committee. Dr. R. M. Saunders sketched the geological and ornithological history of the Island and Mr. Hoyes Lloyd added personal reminiscenses of collecting there. A list of more than 80 species of birds observed during the morning was compiled, with shorebirds creating the most interest. After luncheon, most persons attending returned to the city on the Royal Canadian Yacht Club launches, but a few continued

their exploration of the Island to the eastward. Both the excellent weather and the competence of the persons in charge of the field trip combined to make the excursion a refreshing conclusion to the 1947 meeting of the Union.

RESOLUTIONS

At the last public session on Thursday afternoon, Dr. Josselyn Van Tyne, Chairman of the Resolutions Committee, presented the following report:

Resolved, That we express the grateful appreciation of the American Ornithologists' Union to the Board of Trustees of the Royal Ontario Museum for their generous hospitality and for their kindness in providing us with such excellent facilities for our meeting.

Resolved, that we extend our thanks to R. J. Rutter, F. H. Kortright, J. L. Baillie, Jr., C. H. D. Clarke, O. E. Devitt, F. H. Emery, W. W. H. Gunn, R. M. Saunders, T. M. Shortt, and L. L. Snyder, Chairman of the Local Committee on Arrangements, for their splendid work in planning and carrying out the Sixty-fifth Stated Meeting of the American Ornithologists' Union.

AMERICAN ORNITHOLOGISTS' UNION

REPORT OF THE TREASURER, FISCAL YEAR ENDING AUGUST 28, 1947

RECEIPTS

Balance from 1946		$ 785.18
Dues:		
Fellows	$ 150.00	
Members	475.05	
Associates	6,189.19	
Life (all classes)	200.00	
		7,014.24
Subscriptions to The Auk		985.32
Sales of Publications (back Auks, supplements, etc.)		418.40
From authors for reprints		345.47
Sale of Auk Indexes		88.50
Sale of Abridged Check-Lists		18.70
Contributions		1,402.00
Special funds:		
General Endowment	939.85	
Educational	25.18	
Brewster Memorial	396.17	
Ruthven Deane	254.44	
Bird Protection	52.24	
		1,667.88
Total to be accounted for		$12,725.69

Funds in Bank of Montreal, Ottawa, Ontario, as per statement of August 16, 1947		$ 1,373.69
Special Fund for Publication of Fifth Edition of the Check-List of North American Birds (on deposit in the American Security and Trust Co., Washington, D. C.)		$ 500.00

DISBURSEMENTS

Manufacture of The Auk:		
October, 1946	$2,073.46	
January, 1947	1,679.61	
April, 1947	1,653.05	
July, 1947	1,634.55	
Editor's honorarium	600.00	
Mailing and wrappers (includes mailing of back numbers, corrections to mailing list, stencils, etc.)	438.85	
		$8,079.52
Reprints (repaid in part by authors)		659.30
Purchase of back numbers of The Auk		59.40
Refunds (chiefly overpayments of dues)		12.90
Contributions:		
Zoological Society of London	25.00	
Internat. Comm. on Zool. Nomenclature	10.00	
		35.00
Miscellaneous:		
Shelving for stock of publications at Patuxent Research Refuge	100.00	
Service charges by bank	31.00	
European Relief Committee ($50.00 of this paid by contribution)	123.14	
		254.14
Administrative Expenses:		
Office of the Secretary (clerical help, postage, stationery, etc.)		615.99
Office of the Treasurer and Business Manager (honorarium to Asst. to the Treasurer, postage, expressage, stationery, printing and mailing of bills, etc.)		865.62
Membership Committee (stationery, postage, etc.)		94.77
Total expenditures		$10,676.64
Balance on hand		2,049.05
		$12,725.69

FREDERICK C. LINCOLN, *Treasurer and Business Manager.*

REPORT OF THE A. O. U. COMMITTEE ON BIRD PROTECTION FOR 1947

A REVIEW of bird protection activities in the last 20 years might encourage us to think that much progress is being made if we did not know of so many kinds of destruction that are affecting adversely or threatening the animal life, either directly or by affecting the places that it may inhabit. The churning of the human population over this continent in the last decade, the accelerated penetration of mountains, deserts, and forests by the tractor, and the increase in the kinds of outdoor recreation which destroy living things must be recognized as important influences on the native bird life. Loss of our wilderness has been permitted, possibly because too few people had any acquaintance with it. We may have more success in preserving the remaining small inadequate tracts than the large ones which are more difficult to maintain.

Along the lines of the last report of this Committee we have had many requests for help in the protection of various tracts of land that have been set aside, both locally and nationally, as some form of reserve. These areas have many values besides the sanctuary they provide for birds and other animals and plants. But these values are threatened by the over-use that is taking place as well as the demands that come for special kinds of use. The Union has a special interest in these natural undisturbed areas because of their value for ornithological research. We emphasize especially the desirability of making population studies of all species on natural areas, song birds as well as game species, as a background for the treatment of modified areas.

The following are examples of specific problems which, however, are duplicated in many other areas on the continent.

Point Lobos Reserve in California was established under state auspices to preserve for everyone an outstanding example of picturesque rock and surf scenery in combination with unique vegetation, especially the stand of Monterey cypress. It is on the western shore of the United States, one-third of the way from the Mexican border to the Canadian border. The elaborate care that has been given this small tract has met successfully the threat of many adverse treatments that have been suggested for it. Now the prospect that the integrity of this area will be destroyed by the visitors is causing great concern. This concern develops with every effort to protect land and the animals that live on it.

One of the major conclusions of the exhaustive study made at Point Lobos in 1934–1935 was that it was in the public interest to keep this

land unmodified even at the cost of considerable restriction of use, for thus only could its highest values be perpetuated. At that time it was anticipated that the heavy use such as that brought about by the recent increase in attendance would be so injurious as to require some limitation.

In this tract of land the values depend on strict preservation of those conditions which must be maintained naturally and which cannot be modified or restored by artificial means, no matter how well intentioned. It is important to distinguish the kind of need which is served by these unique natural conditions from the need for playgrounds and other types of outdoor recreation which do not depend on a very specialized type of natural conditions. The ground for the latter need can be made, modified, or extended by the ways known and practiced generally by administrators of parks.

In a study of the ways in which visitors respond to Point Lobos, it was learned that people with widely varied purposes came to the area. Fishermen made up the largest group and most of them appeared to come solely on account of the accessibility of the ocean, paying little attention to anything on the land. Picknickers, another large group, appeared to be even less aware of the details of their surroundings. Since they usually came in parties—as many as fifty were seen together—they were likely to be so preoccupied with their own activities, chiefly social, as to miss almost entirely any contact with their natural surroundings—unless these involved discomfort. Moreover, they occupy the belt of shoreline which is most attractive to the visitor desirous of becoming acquainted with the segment of the out-of-doors represented here. This latter type of visitor is the one which should be encouraged and helped in as many ways as possible even if this involves restricting the pleasures of the crowds on this area. Other sites outside the Reserve can be provided for their use.

The injury that is now taking place at Point Lobos can be stopped and the situation can be greatly improved for all the people who want to come to the area because of its unique qualities. The small size of the area requires special care of the soil to maintain its natural character. The land will not withstand the heavy use which the recently increased number of visitors imposes. We believe that a satisfactory remedy would be to discontinue fishing and picknicking.

Another kind of injury to lands set aside for protection in a natural state was proposed when the California Legislature in 1945 adopted a resolution requesting the Park Commission to investigate the matter of permitting hunting in the State Parks, and to modify its present rules where hunting could be permitted without prejudice to estab-

lished park procedure. Some reasons for not modifying the rules are as follows.

The problem of protecting land from the destructive effects of the more injurious human use is of great concern to nearly all naturalists. Many organizations have as a major objective the preservation of samples of natural types of land to serve as standards for comparison with the more heavily used areas. A stage has been reached in this country where few examples of the original landscape are left. The State and National parks contain some of the best tracts available for protection for this purpose. Most of the uses made of them by visitors do not seriously interfere with these values. Nearly all of the areas, however, deserve better protection than they now receive. And we can think of none where it would be justified to permit hunting in any manner.

As an important policy in maintaining any area in its natural state it would seem necessary to preserve the animal life intact and free to follow natural changes in population unmodified by human disturbance, because the animals are important agents in making and preserving the true character of the landscape. Their importance in determining the nature of the soil, the vegetation, and even some features of the topography is not always apparent to superficial examination. Careful study usually reveals that every animal fills some niche which contributes to the welfare and organization of the natural community. They are important in small areas as well as in large ones. It is the whole assemblage of animals and plants that needs protection, including every species, including predators.

The areas in the deserts are especially important because their nature is so easily changed by harmful modification such as shooting. Because of the fine balance of nature imposed by difficult climatic conditions, slight changes cause widespread results and recovery is slow. Plants and animals are likely to be represented by sparse populations, in which the organisms are far separated, dependent on delicate adjustments to their surroundings, and slow to recover from destruction.

Great harm may come to the friendly tradition of public appreciation now partly built up toward parks, if shooting within them is sanctioned officially. People generally expect to find any park immune to this kind of injury, and on many occasions we have seen visitors concerned over what they consider a likely violation, as by possession of weapons in a park. Also, it seems certain that the safety of the visitors, who have recognized claims to go to the areas, requires that there be no shooting.

On a wider scale the problem of adequate protection has come up in connection with the studies of the National Park Concessions Advisory Group. We have prepared the following paragraphs to represent our views concerning park use. In general our acquaintance with this problem indicates far too little regard for the capacity of the land and the plants and animals that live on it to maintain their characteristics without help. At the same time we generally seem to underestimate the ill effects of disturbance that accompanies improvements. Overpopulations of such ungulates as deer and elk may result in special problems on park areas.

National Parks may be kept in a state of greatest value to visitors and other people if adequate protection is given the normal processes of nature. All parts of each park should be freely accessible to any person able to get to it without injury to the park. Most valuable kinds of use are those which enrich personal experience with natural elements of the landscape. Factors which permit people to get this experience are to be encouraged; those which interfere are to be discouraged.

Protection of the landscape to keep it available for study or enjoyment implies deliberate efforts to avoid disturbance by human-made structures including buildings, roads, trails, lakes, canals, power lines, and signs. When these injuries or distracting elements cannot be escaped, they should be allowed to affect as small an area as possible, and they should be kept on the least valuable part of the land. No livestock should be kept for profit within any National Park. No part of the soil, water, vegetation, or animal life should be intentionally disturbed, or harvested for profit. Contracts permitting such interference within the parks should be terminated as soon as possible, or the land concerned should be eliminated from the park.

Responsibility to all the people requires that the parks be kept continuously intact and free from injury by human activity. Adjustment of boundaries should be made with proper consideration for permanent needs and for local concern with the area. Responsibility to visitors involves the provision of living facilities suitable for their minimum needs as long as these are compatible with requirements for protection of the area. Additionally, some help in the interpretation of, and direction of attention to, the character of the area is justified, though under no circumstances should this develop into unsolicited instruction or time-consuming entertainment. The aim should be to allow the visitor to discover the true nature of his environment as represented in the park.

Parklands recently acquired or improperly managed may need a

special kind of treatment to reëstablish the normal existence of the set of native organisms that belong there. We should thereafter make no artificial change either to help or to hinder the natural changes that occur. Administrators need to develop confidence that the natural processes are capable of maintaining an area with all the desirable qualities. They may then help visitors and other people to recognize the importance of these natural principles in the care of land everywhere. The demonstration of these relations will depend on seeing the land, the plants, and the animals as they exist in response to seasonal and other changing elements in their normal surroundings.

Still another problem, which concerns us because it involves the direct killing of rare birds and the despoiling of their habitats, is the preservation of birds on the Pacific Islands occupied by the United States Navy.

The American Ornithologists' Union recently adopted the following resolution. "The Council of the A. O. U. in session at the 63rd meeting at Cambridge, Massachusetts, wishes to record its concern in the fate of the native flora and fauna of Pacific Islands throughout the zones of military occupation. It hereby emphasizes to Government authorities the importance of continuing steps to safeguard such animal and plant life which is unique and hence irreplaceable."

Special studies bearing on this problem were made in 1945 on the Midway Atoll by naturalists representing the Board of Agriculture and Forestry of the Territory of Hawaii and the United States Department of the Interior. These have provided reliable information about the effects of the war on insular populations of birds on the Midway Atoll of the Hawaiian Archipelago. The results of this survey have been published and they show that two species, the Laysan Rail and the Laysan Finch, have been exterminated and certain other bird species have been greatly reduced in numbers.

It is fitting that the A. O. U., along with other organizations, again call attention to this urgent situation and request that action be taken where possible to carry out the following suggested means for alleviating damage to oceanic birds.

Provide protection for all birds native on the islands and for their nesting grounds by preventing the shooting, capture, or disturbance of the birds or the gathering of their eggs and by preventing the bringing in, possession of, or release of any birds or mammals not native on the island. This requires the removal of introduced animals such as rats that are already established. Also necessary is restriction of vehicular travel to roads and special care in placing additional structures where they cause little interference with the special kinds of birds

which live on the islands. Overhead wires, towers, and barriers no longer needed should be removed and unused pits should be eliminated and used ones screened. Other kinds of disturbance resulting from military use of the islands can be reduced by following the advice of competent naturalists.

As to the fate of the waterfowl in North America, we think of this as a permanent problem and not one that will be settled in any one year. Also it is clearly not the concern of the A. O. U. to help provide great numbers of birds for hunting nor, on the other hand, to hinder hunting when this does not endanger the continued existence of any species of bird. It may be more appropriate for us to try to define a sound, long-term policy relative to the waterfowl population and its maintenance than to become engrossed in the many temporary expedients involved in the yearly regulations. At the same time we should express opinion concerning the current regulations when they do not seem to be compatible with existing conditions.

An urgent but long-time problem is the loss of habitat which is occurring over the whole continent and especially in the south where the waterfowl are highly concentrated in winter. The great oil fields of the Gulf States, now being extended eastward, have destroyed large areas of aquatic habitats and the concentrated activities have driven the birds from wintering grounds. Saltwater intrusion resulting from the systematic development of the Intra-coastal Canal by the Army Engineers has injured thousands of freshwater duck marshes. This canal extends from New York along the coast to Galveston and Brownsville, Texas, and it goes through the very heart of the southern coastal wintering grounds. Further extension and completion of gaps in the canal will bring saltwater into many thousands of acres of remaining freshwater marsh. Much of this intrusion can be prevented by proper routing and the construction of plugs to keep out the saltwater. The canal will run through, or contiguous to, many of the important wintering ground refuges planned by the Fish and Wildlife Service.

Diversions of entire rivers over to other river valleys have resulted in the destruction of thousands of acres of wildlife, and especially waterfowl, habitat. The Santee-Cooper diversion is an example. Other diversions of this kind are being promoted, such as the Colorado-Big Thompson diversion by the Bureau of Reclamation, the Klamath-Trinity diversion being studied on the west coast, and many others still on the drafting boards. Canalization of rivers is still another factor reducing suitable waterfowl habitat in the South. The Lower Mississippi River, the Rio Grande, and other large rivers formerly

maintained large duck marshes in their bordering overflow swamps, bayous, and secondary channels. Now they are speedily being straight-jacketed by enormous levees which result in great reduction of waterfowl habitat. Drainage of other kinds is again being undertaken on a large scale and by new agencies with resulting great destruction of habitat unless sufficient refuges are established soon. Industrial development in the South and West are bringing still other kinds of serious damage to aquatic habitats and the organisms which inhabit them.

In an extended statement about the waterfowl program, issued this summer, the Fish and Wildlife Service described the nature of its responsibility for the welfare of the waterfowl and pointed out that hunters and other people interested in game also have important responsibilities. The Service invited participation in the gathering of needed information and help in the care required if the birds are to be kept at adequate numbers. The program falls into six main categories: Production, Breeding Grounds, Migration and Wintering, Law Enforcement, Mortality Causes, and Inventory. The outline is comprehensive enough to be useful to waterfowl biologists everywhere, and it indicates certain means by which other agencies can help to solve the problems presented.

When this report was being prepared, in May, we were assured by federal officials that there does not seem to be any reason to believe that any one species of waterfowl is approaching extinction. Species showing decreases in the 1947 winter inventory included Blue-winged Teal, Black Duck, Buffle-head, Wood Duck, Brant, and Snow geese. At the same time there were published reports that the 54 million waterfowl inventoried in January were only 43 per cent as many as had been tallied three years earlier. It was reported also that 2 million hunters in 1946 had killed 14 million ducks. The number of hunters then was three times as great as in 1935. The opinion given before meetings of hunters throughout the country was that the generally conceded decline in duck numbers could be checked by additional restrictions and that at the same time some shooting could be allowed during the next open season. Our opinions are indicated in the following brief outline of the situation as regards North American waterfowl in 1947.

Main interest of the A. O. U.—To encourage restoration of numbers of waterbirds sufficient to preserve the species as prominent members of the avifauna in all parts of the continent where they are native.

The situation as it concerns these birds.—The former extensive marshy areas have become so reduced that insufficient habitat, both as to

variety and extent, is available. The artificially flooded area, together with existing natural marshland, does not provide suitable, year-round conditions for all the kinds of birds concerned. The restriction of wintering habitat through mosquito control and other human activities is particularly serious.

Combined with the generally unfavorable environmental conditions, the continued increase in effectiveness of shooting makes a greater drain than the ducks can withstand.

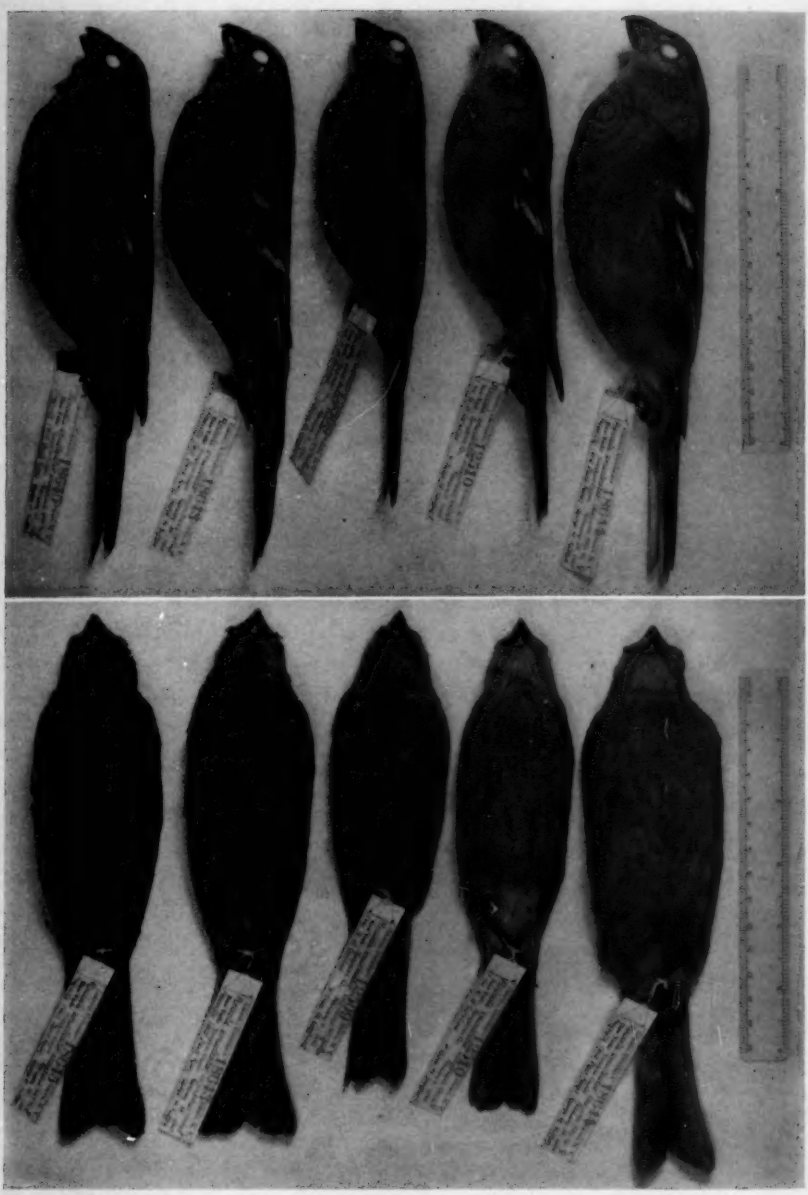
People generally, and hunters in particular, have been encouraged to want larger waterbird populations than can be supported under present environmental conditions.

Conclusions.—Too many persons want to shoot ducks to allow the continued existence of all the kinds of waterbirds in desirable numbers unless more discriminating treatment of the environment is practiced.

More drastic regulation of shooting will be necessary than any in force in past years. Neither improvement of habitat nor stricter regulation of shooting will, however, solve the waterfowl problem satisfactorily. The final solution must be some combination of these.

Better information concerning the status of the birds, the limitations which control their numbers, and the prospects for continued hunting should be made available to hunters so that their needed help will be forthcoming in making effective the necessary restrictions to hunting, and so that they will give support for desirable improvement and protection of the marshes.

JEAN M. LINSDALE, Chairman
JOHN W. ALDRICH
IAN MACTAGGART-COWAN
PHILIP A. DUMONT
PAUL L. ERRINGTON
S. CHARLES KENDEIGH



PINE GROSBEAKS FROM ITHACA, NEW YORK. (*Left to right*): TWO ADULT MALES, ONE IMMATURE MALE, ONE FEMALE (*Pinicola enucleator eschatosus:* ONE FEMALE *P. e. leucura*.

GENERAL NOTES

Small Pine Grosbeaks collected in Tompkins County, New York (Plate 5).—Whether or not the A. O. U. Committee on Classification and Nomenclature believes the so-called Lesser Pine Grosbeak, *Pinicola enucleator eschatosus* Oberholser, to be worthy of recognition (the race is mentioned in a footnote in the 1931 A. O. U. Check-List but not in any of the recently published Supplements thereto); and whether or not the *breeding* range of this small, supposedly eastern North American race is fully understood, I feel that I should comment on five Pine Grosbeak specimens from the Cornell University collection which I have recently handled and identified. Three of these, two adult males and an adult (?) female (C. U. Nos. 18643-5) I collected at one shot on the Will Davis farm near Freeville, Tompkins Co., New York, on February 25, 1940. The other two, an immature male and a female (C. U. Nos. 12509-10), William M. Longhurst collected near Caroline, Tompkins Co., New York on February 11, 1942. All five skins were well prepared and are in excellent condition.

The two Longhurst specimens are so small in every way that they instantly stand out from the five (*see* Plate 5). They measure as follows: the young male, wing, 109 mm., tail, 90; the female, wing, 109, tail, 87. The female, which was not fat, weighed 58.5 grams. The male apparently was not weighed.

As for the three birds which I collected, the two adult males measured: wing, 116, 111.5; tail, 92, 92; and weighed 62.4 and 63.9 grams, respectively. The female was very large by comparison, weighing 72.4 grams (8.5 grams heavier than the heavier of the males) and measuring: wing, 115; tail, 96. In color the two males differed somewhat *inter se*, the longer-winged one being scarlet or orange-red, the other somewhat rosy or pinkish red.

What shall these five birds be called? The large female is almost certainly a Canadian Pine Grosbeak, *P. e. leucura* (Müller); but the other four do not appear to belong to that race, and in our search for the correct name for them we naturally turn first to *eschatosus*, a form evidently believed by its describer to be endemic to Newfoundland (*see* Proc. Biol. Soc. Washington, 27: 51, March 20, 1914). The eight Newfoundland birds examined by Oberholser in connection with his study indubitably were small, the males measuring: wing, 109–116 (average, 113.5); tail, 91–93 (average, 90.7); the females: wing, 104–106 (average 105.3); tail 84–92 (average, 86.9); but Josselyn Van Tyne (Auk, 51: 529–530, 1934) has clearly shown that in Michigan and Ohio a small-sized Pine Grosbeak, which he has identified as *eschatosus*, is a "more common winter visitant" than *leucura;* Ludlow Griscom (Proc. New England Zoological Club, 14: 12, February 12, 1934) believes that "a small subspecies [which he calls *eschatosus*] with a shorter and narrower bill . . . breeds from central Labrador and Newfoundland south to the Gulf of St. Lawrence region, and more locally throughout the maritime provinces of Canada to the mountains of northern Maine and New Hampshire"; and my own investigations have convinced me (1) that careful collecting will reveal the presence of small individuals among the flocks of Pine Grosbeaks which wander southward into the northeastern United States in winter and (2) that these birds should bear the name *eschatosus*.

Of the 24 specimens which Van Tyne examined in the flesh, five male *leucura* weighed 70–83 grams, while nine male *eschatosus* weighed only 52–61 grams; and three female *leucura* weighed 70–81 grams while seven female *eschatosus* weighed 54–61.2 grams. My Freeville, New York female and the Longhurst immature male, referred to above, thus were clearly within the weight-range indicated for

leucura and *eschatosus*, respectively; and my two male birds, while slightly heavier than any *eschatosus* weighed by Van Tyne, were obviously not nearly heavy enough for *leucura*.

To Robert B. Lea, who took the photographs upon which the illustrations are based, and to Dwain W. Warner, who carefully checked the measurements of the five specimens, I hereby extend my thanks.—George Miksch Sutton, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

The specific name of the Olive Warbler.—Through some curious oversight, it appears to have escaped observation for over a hundred years that *Sylvia olivacea* Giraud, 1841, is preoccupied by *Sylvia olivacea* Vieillot, 1817 (Nouv. Dict. Hist. Nat., nouv. éd., 11: 105—*ex* Levaillant, Ois. Afr , 3: pl. 125, fig. 2). There is no escape from the necessity of finding a new name for Giraud's bird.

Vieillot cited two different birds under the name *Sylvia olivacea* on the same page of the Nouveau Dictionnaire. The first of these is *Motacilla olivacea* Gmelin [Syst. Nat., 1 (2): 964, 1788] although credited to Latham (Ind. Orn., 2: 532, 1790) who first assigned it to the genus *Sylvia*. I am unable to identify this bird, ostensibly from Ceylon, and I can find no authority who has ever succeeded in doing so. In fact, except for a few authors of very early date, I can find no reference to it. In view of the scanty basis for Gmelin's name—a wretched drawing and a few lines of discussion in Peter Brown's Illustrations of Zoology: 33, pl. 14, 1776—it may be as well to leave it unidentified. In such uncertainty it will preoccupy the specific name *olivacea* only in the genus *Motacilla* where no conflict is evident.

This is not true of Vieillot's second *Sylvia olivacea*, based on Levaillant. This appears to be the African species more recently called *Camaroptera brachyura* (Dr. James P. Chapin kindly informs me) by certain authors who were possibly confused by the two usages of *Sylvia olivacea* on the same page of Vieillot and inclined to adopt line priority (for which there is now no justification under the International Rules of Zoological Nomenclature). It appears certain that this second *Sylvia olivacea* of Vieillot is quite valid but in any case it precludes the usage of the same name by Giraud.

The next available name for Giraud's species is *Sylvia taeniata* Du Bus [Bull. Acad. Roy. Sci. Lettr. . . . Belg., 14 (2): 104, 1847—"le Mexique"] and the species in question must, therefore, be known as *Peucedramus taeniatus*. There is no question as to the specific assignment of the name. The problem arises only in respect to the subspecific assignment.

The type (an obvious male) is still extant in the Royal Natural History Museum of Belgium, in Brussels. Through the kindness of Dr. R. Verheyen of that institution and of Captain Jean Delacour who undertook to compare the type with examples of the different subspecies (except the smallest of them, *micrus*), it is possible to suggest the restricted application of the name *taeniatus*.

In measurements (wing, 72 mm.; tail, 51), the type is smaller than "*olivaceus*" and *arizonae* and larger than *micrus*, agreeing with the minimum of *jaliscensis* and the average of *aurantiacus*. It is an old mounted bird and greatly faded, and in its present condition agrees best, according to Captain Delacour, with *jaliscensis*. If allowance is made, however, for considerable fading that must have taken place during the last century, I believe that assignment to *aurantiacus* is more strongly indicated.

Bonaparte (Consp. Avium, 1: 309, 1850) cites "*Sylvicola taeniata Dubus . . . Esq. Orn.* figura, *ex Mexico m. S. Pedro, Oxaca*" [sic]. According to Sherborn (Index Anim.), the figure of this bird appeared on plate 28. This was published about 1850,

apparently without accompanying text which was not supplied beyond plate 20. I have not seen plate 28 but presume it is like the first twenty plates (kindly lent by the Museum of Comparative Zoölogy) in having no localities given on it. It is possible, therefore, that Bonaparte obtained his citation of San Pedro, Oaxaca, from Du Bus, himself. Most of the birds described from México by Du Bus were sent to the Brussels Museum by Ghiesbreght and at least two of them (*Euphonia elegantissima* and *Cyanocorax unicolor*) were definitely reported in the Esquisses from "San Pedro, près de Oaxaca." There is every probability, therefore, that the type of *Sylvia taeniata* also came from San Pedro, although which one of the localities of that name in Oaxaca is not certain.

The birds of Chiapas have been identified by authors as *aurantiacus;* those of Vera Cruz are "*olivaceus.*" Oaxaca lies between these other two states. Since the type of *taeniata* is too small to be referred to the Vera Cruz form but agrees with *aurantiacus* in measurements, its identity with *aurantiacus* is again indicated.

I suggest, therefore, that *Peucedramus olivaceus aurantiacus* Ridgway, 1896, should bear the name *Peucedramus taeniatus taeniatus* (Du Bus). This still leaves the subspecies "*olivaceus*" without a name. I propose, therefore, the name *Peucedramus taeniatus giraudi* as a new name for *Sylvia olivacea* Giraud (not of Vieillot, *ex* Levaillant), Descr. Sixteen New Species N. A. Birds: 16, pl. 7, fig. 2, 1841—"Texas" = Las Vegas, Vera Cruz, México. The other subspecies will be known as *Peucedramus taeniatus taeniatus, P. t. arizonae, P. t. jaliscensis,* and *P. t. micrus,* respectively.—J. T. Zimmer, *American Museum of Natural History, New York, N. Y.*

Rufous Hummingbird at sea.—On March 28, 1944, while the aircraft carrier on which I was stationed was approximately one hundred miles west of San Diego, California, and approximately seventy miles south of San Nicolas Island, the nearest land, a male Rufous Hummingbird (*Selasphorus rufus*) flew aboard the ship. He remained within a few feet of me for several minutes and was observed perched on an iron railing on the catwalk as well as in flight before he left the ship. The late Dr. Clinton G. Abbott of the San Diego Museum informed me that he knew of no other instance of this species being observed so far at sea and urged that this account be published after the end of hostilities.—Gilbert S. Raynor, *Manorville, Long Island, New York.*

Mourning Warbler trapped and banded during a blizzard.—During the first hard snow storm of this last winter in the vicinity of Keuka College, on March 2, 1947, I was watching the birds at a feeding tray of Mr. and Mrs. Edgar Bingham. To my surprise a warbler came to the suet on a tray suspended from the ceiling of the porch about two feet from the window. Mrs. Bingham and I checked the markings while the bird, which appeared in good health, fed. It was olive above and pale yellow below, including the under tail-coverts. There was a dark gray wash on the head which extended under the throat.

By fortunate coincidence, I had arranged to have students of my class in bird study come in to watch a bird bander, Malcolm Learch, of Penn Yan, trap and band birds that afternoon. Not long after the traps had been placed, the warbler came from the willow trees in a near-by ravine into a spruce tree a few feet from the tray, then into a trap on the floor of the porch.

In hand, the bird showed no streaks on the breast and no eye-ring, and the under tail-coverts were half as long as the tail. The darker feathers on the head made us confident it was a Mourning Warbler (*Oporornis philadelphis*).

Mrs. Bingham said she had seen the bird earlier the previous week, and reported

that it came often to feed for several days after it was banded and continued to be very active.—Hazel R. Ellis, *Keuka College, Keuka Park, N. Y.*

Confusion of eastern Caprimulgidae.—Maryland, Virginia, and the Carolinas were the seat of many of the earliest permanent settlements, and information gleaned there came to be embodied in pioneer accounts of American natural history. The people and, to hardly a lesser degree, the naturalists, were confused as to the number and characteristics of the species of Caprimulgidae of the region. One, the Nighthawk, forced itself on their sight but may not have impressed them with its notes, while two, the Chuck-will's-widow and Whip-poor-will, made the woods resound with their calls but were seldom or never seen. The usual consequence was telescoping the three into two, the attributes of which were mixed in various ways.

Gmelin, in what he called the 13th edition of the Systema Naturae of Linnaeus [1 (2): 1028, 1789], based the name *Caprimulgus carolinensis* mainly on the Goatsucker of Carolina, described and figured by Catesby (The Natural History of Carolina, etc., 1: 8, pl. 8, 1731). This is accepted as the earliest technical designation of the Chuck-will's-widow but both the text and the plate, on which it was founded, evidence the confusion referred to in our first paragraph. In the text, it is said that the bird was that called East India Bat in Virginia; this appears to be correct; witness the quotation from John Clayton in An Account of Carolina and the Bahama Islands (Vol. 2 of Catesby's work: 16, 1743), in which he contrasts it with the Whip-poor-will. But Catesby goes on to say of the Goat-Sucker of Carolina: "before rain, the air is full of them . . . Their note is only a screep; but by their precipitating and swiftly mounting again . . . they make a hollow and surprising noise . . . like that made by the wind blowing into a hollow vessel." These remarks certainly apply to the Nighthawk. In fact, except for the designation East India Bat (defined only at second hand 12 years later), there is nothing in the text distinctive of the Chuck-will's-widow. As to the illustration, it may be passed on the whole as something like a Chuck-will's-widow, but erroneous in that the rictal bristles have no branches and as confused with the Nighthawk by a large white spot being shown on the primaries. The whole presentation, the basis of the accepted scientific name of the Chuck-will's widow, is certainly less than half satisfactorily identifiable with that bird.

Relying as Catesby did on Clayton's testimony as to what the East India Bat was, we should, nevertheless, note use of that term as a synonym of "musqueto hawk" by John Lawson (History of Carolina, etc.: 277, 1714; orig. ed., 1709), which may have been intended for the Nighthawk. Early naturalists erroneously put in the synonymy of *carolinensis* various birds of Middle and South America but only confusion with other North American species is here noted. Wilson (American Ornithology, 3: xiv, 1811) wrote of the Nighthawk as the great bat of Virginia; the latter, however, is the Chuck-will's-widow. Nuttall (Manual, Land Birds: 617, 1832) gives "weacoalis" of the Delaware Indians as a synonym of the "chuck" but obviously it is another onomatope of the Whip-poor-will. John L. Williams (The Territory of Florida, etc.: 74, 1837) lists "Muckawis. This bird resembles the Whip-poor-will in everything but his note." In this case also, an obviously sonic, Indian name of the Whip-poor-will is used for the Chuck-will's-widow that was apparently in mind.

To dispose next of the second name of Catesbyan basis, let us consider that of the Nighthawk. By what must be among the shortest indications ever used to establish a name, John Reinhold Forster in 'A Catalogue of the Animals of North America,' etc.: 13, 1771, designated it: "Goatsucker. Lesser. Capr. minor. C. III. 16." The latter cryptogram refers to Catesby's 1743 volume, previously noted, where, consulting the text, we find that it relates almost 100 per cent to the Whip-poor-will. As to

the plate, it represents a Nighthawk, with the addition of strong rictal bristles, which may have been put there for better agreement with the text, where they are twice mentioned. Taking the whole combination, and giving text and plate equal weight, it may be appraised as about 45 per cent Nighthawk. Such is the basis of *minor* Forster, as it was also for the long-used *virginianus* Gmelin, in connection with which Whip-poor-will (Catesby) was openly cited and the statement made that it calls "wiperi-wip." Confusion as to this second species thus was running strong from the beginning.

It was not until Wilson's time (American Ornithology, 5: 71, 1812) that anyone got around to giving the Whip-poor-will a technical name of its own—the very appropriate "*vociferus*." In the way of mix-ups, it may be mentioned that in George Edwards's 'A Natural History of Birds' 1: 63, 1743) as in Catesby's work, the figure is of a Nighthawk while the text relates to the Whip-poor-will. Bartram (Travels Through North and South Carolina: 293, 1791) refers to the Nighthawk or Whip-poor-will, and Barton (Fragments of the Natural History of Pennsylvania: 3, 1799) transposes this to Whip-poor-will or Nighthawk.

Vieillot (Histoire Naturelle des Oiseaux de l'Amerique Septentrionale, etc.: 55, 1807), writing of the Whip-poor-will, stated that it was called *payk* and *peesk* by Hudson Bay Indians. On both geographic and sonic grounds these names can apply only to the Nighthawk. On the next page (56) of the same work, then dealing with the Nighthawk, he wrote (in translation), "The name I give to this Engoulevent is derived from the cry it utters when perched—which has been expressed by the word Popetué." From the cadence of this word, one would suspect it of being an analogue of "Whip-poor-will" but other evidence on this point has not yet been forthcoming. Again one wonders whether it may have anything to do with the term, "pope" which was recorded early enough for him to have seen it in a French translation (2: 197, 1790) of a work by Thomas Anburey (Travels Through the Interior Parts of America, 1923 edition, 2: 132; original ed., London, 1789). There, discussing the "whipper will," Anburey wrote: "it is also known by the name of the *Pope*, by reason of its making a noise resembling that word when it alights upon a tree or fence." "Pope," of course is the "boom" of the nighthawk in flight. Speaking of that bird as the "musquito hawk," he exemplifies the general popular confusion of our Caprimulgidae by saying: "I . . . am apt to conclude, that the Musquito hawk and whipper-will are the same bird." Anburey was a British officer on parole in Connecticut at the time, where the name "pope" appears to have been then current. Samuel Peters (History of Connecticut: 194, 1781) got the matter a little straighter, saying: "It [the whipperwill] is also called the pope, by reason of its darting with great swiftness from the clouds to the ground, and bawling out Pope!" The sound is made by vibration of the primaries as the wings are stiffly held in V-shape while the bird falls through the air, and by the Nighthawk, not the Whip-poor-will. Thus the confusion of Caprimulgidae in colonial times was not confined to the southeast nor is it now. Each of the three species here considered is called "Whip-poor-will"—the Nighthawk in four states, to my knowledge, and the others throughout their ranges. Each is called bullbat and mosquito hawk and, variously paired, two of them share such names as night bird, night hawk, and nightjar. Evidently their discrimination is too much for the public even at this day.—W. L. McAtee, *Chicago, Illinois.*

The correct name for the "Pauraque."—Witmer Stone in a note in The Auk in 1929 (46: 389) gives a short history of the name "Pauraque" and its variation "Parauque," indicating a preference for the first spelling, and quoting Major Allan Brooks to the effect that this is an onomatopoeic version, by the Mexicans, of the

bird's call. Edward R. Ford in 1930 (Auk, 47: 254) comments on Stone's note and on Spanish pronunciation, indicating his belief that Sennett in first writing the name transliterated the Spanish sounds as they sounded to his English ear, with resultant error.

While working in the south-Texas border country in the vicinity of Rio Grande City, in 1938, I had frequent occasion to discuss, in Spanish, the fauna of the area with the local Mexicans, who, although often American citizens, usually possessed only the scantiest fragments of English, and had mostly come more or less recently into this country from Nuevo León, Tamaulipas, and other Mexican border states. The people called the bird "Parruaca" which, in accordance with Spanish rules of pronunciation generally, and local usage in particular, is pronounced, "Pahr-r-r-wah'-kuh," the "r" being rolled rather strongly, the accented syllable "wah" cut rather short, and the final syllable "kuh," swallowed—that is, pronounced on an indrawn breath. As the "pah" part of the first syllable is also pronounced rather shortly, or not voiced distinctly, the general effect when heard is of the trilled "r" and the accented "wah," followed by a clean cut "kuh." The result as absorbed by the ear is not unlike our word "squawk," though softened by the preceding and following sounds. The spelling is in accordance with usual Spanish usages, as "Pauraque" and "Parauque" are not. These, though pronounceable in Spanish, give a distinct shock to the sensitive Hispanic eye. I believe that Ford's interpretation of Sennett's mistake is correct, so far as it goes, and that Stone's correction, while a step in the right direction, is in itself incorrect.

These birds were often observed flying at dusk in the brushy border country, and were seen to come to the local cattle "tanks,"—water containers standing five or six feet high above the earth, and ten to fifteen feet across—over which they were frequently observed to pass, leaving small ripples in the water behind their beaks, either while engaged in drinking on the wing, or catching insects just above the surface of the water.—RODGERS D. HAMILTON, *Museum of Zoology, University of Michigan, Ann Arbor, Michigan.*

Those tall Sinai quails.—Dr. Joshua L. Baily, Jr., writing in Herpetologica (3: 41–48, 1946) says that Moses' statement that the quails of the Sinai peninsula stood two cubits above the ground (Numbers, 11: 31) strains the credulity of most readers and has led to at least one suggestion that these birds may have been herons or dodoes. (J. M. C. Plowden, Once in Sinai, Methuen & Co., London, 1940, p. 192).

Mr. Anthony Curtiss of Port-au-Prince, Haiti, has this to say in rebuttal in a letter dated: "1946, Friday, Eighth night of Dhul hijja approaching All Saints' Day. Your author is surely in error in saying that Moses related that the miraculous quails *stood* two cubits high. The Hebrew is not very explicit; it says: ' . . . and about two cubits above the ground.' St. Jerome's old Vulgate translation is most helpful in cases of this kind for it is based on fourth century Hebrew MSS, whereas the oldest Hebrew MS that we now have is a tenth century one. St. Jerome says that the quails *flew* at a height of two cubits above the ground. Indeed the Hebrew context indicates that to be the true meaning."

Mr. Curtiss' explanation seems to be a good one. The writer had thought that the birds referred to might have been bustards, similar to our present giant bustards. —CHAPMAN GRANT, *San Diego, California.*

American Raven nesting in houses.—For a number of years we have been exploring a wild canyon country in the Columbia Basin in eastern Washington. One of the surprising discoveries made on our trips into this area was the not infrequent

nesting of Ravens in old deserted houses. The region is an arid sage-brush area, deeply scarred by canyons walled by colorful basalt rimrock. Rarely visited by man, the area affords refuge to numerous hawks, Prairie Falcons and Ravens. Abundant food supply is afforded in most years by the jack-rabbits, Columbia ground squirrels and field mice.

On the sage-brush land bordering the canyon a number of brave settlers homesteaded two generations ago, but now all that remains to tell the story of their struggle against drought is an occasional half-tumbled-down cabin which has taken on the dull gray color of the shifting soil on which it rests.

It is in these wrecked buildings that some of the Raven pairs have made their nests, choosing a site in the low, roofed attic where the bulky nest rests on the cross timbers. This is quite a departure from the site commonly selected by the Ravens, which is in a recess on the face of the canyon wall, sometimes partly protected by an overhanging ledge, or on the top of a basalt column. Twice we have found their nests in trees, one of these only ten feet from the ground. Our biggest surprise came on our first trip into the canyon area. We had seen the canyon walls and turrets from the distance, and leaving the country road we followed an old trail along the floor of the coulee which led down toward the canyons. We had gone but a short distance when there appeared an old shack and tumbled-down stable, long deserted. As we came closer a Raven flew from the roof of the building and was soon joined by the mate. "Maybe they have a nest there," remarked my wife. "No, they always nest in the cliffs," I replied, with superior wisdom. But, as we came to the building, we observed a window opening at the end, leading into the attic, and the wall below the opening was well whitewashed with the droppings of birds.

I braced some old planks slantwise below the opening and climbed up to investigate. When my eyes became accustomed to the dark interior there came into view a half-rotted old mattress lying on a rusty bed-spring, and on this rested the Raven's nest with five half-grown Ravens clambering over the edge!

The Ravens have nested in this deserted cabin for eight consecutive years now, but since our first visit to their attic room they have not utilized the bed-spring and mattress accommodation, but have built the nest on the floor just to one side of the entrance window.

These birds are early nesters. The eggs are laid in the fore part of March, and protection from the cold is afforded by the deeply hollowed nest, very thickly lined with sheep's wool and cow hair. The great bulk of the nest is made up of sage-brush sticks. Six or seven eggs are the usual complement. One March when we visited this nest it held a family of naked little babies, but on our next visit a week later the nest was empty. They may have afforded a meal for a pair of Northwest Horned Owls whose family we were photographing in a near-by canyon, or possibly they were meat to the pack rats occupying the downstairs apartment. However, another setting of eggs was soon laid, and this brood reached maturity.

Another pair of cabin-dwelling Ravens had added an unusual feature to their nest construction in the way of a 'front walk.' We saw the pair about this old cabin and went over to investigate. The building had been in a state of disrepair for many years, was somewhat tilted on its foundation as a result of many earth-eroding dust storms, and the chimney, which had been built on the outside of the end wall, had collapsed. The birds made their entrance to, and exit from, the attic space through a gap left by the collapse of the chimney. Only the cross-timbers separated the attic from the room below, as the ceiling boards had long since been pulled off. The big nest had been built straddled over two of the timbers, back about eight feet from the

opening in the wall used by the Ravens as their entrance, and we were indeed surprised to find that an approach to the nest had been constructed by laying sticks of sage-brush across the two parallel timbers uniformly bridging the space between, and forming a walk-like approach from the opening in the wall back to the nest. One might question whether this was accidental, but there was not the slightest appearance of careless dropping of nest material en route during the period of construction. We believe that any observer would have concluded that this walk-way was constructed with deliberate intent. Quite possibly the accidental dropping and lodging of a few sticks may have given these crafty birds a hint which they were keen enough to follow up.

In all, we have made this observation of a pair of Ravens nesting in an old cabin on five different occasions.—R. T. Congdon, M. D., *Wenatchee, Washington.*

Green Heron captures flying dragonflies.—On July 31, 1946, while watching birds in Harrison Park, Owen Sound, Ontario, I saw a Green Heron (*Butorides virescens*) capture two small, blue dragonflies while the insects were in flight. The heron was perched on a branch of a sunken log, about eighteen inches above the surface of the water, with its neck folded. Suddenly it darted out its head to capture one of a group of dragonflies which were flying about over the water. After eating the insect, the bird opened and closed its beak slowly several times, then 'froze' until another dragonfly came within reach, when the performance was repeated. A. C. Bent (1926) describes a case of the Great White Heron (*Ardea occidentalis*) capturing moths hovering about flowers, and calls the Great Blue Heron (*Ardea herodias*) "an expert flycatcher," but I have been unable to find any other case of the Green Heron catching flying insects.—Fred Warburton, *444 Second Ave. East, Owen Sound, Ontario.*

Triangle spike rush as waterfowl food.[1]—During field investigations in connection with the waterfowl studies of the Maine Cooperative Wildlife Research Unit, several observations were made of ducks feeding on triangle spike rush (*Eleocharis robbinsii*). Although this plant is distributed over much of the eastern United States, there seems to be no specific record in the literature of its use as waterfowl food.

Frequent observations at the Davis-Holbrook Marshes in East Eddington and Holden, in central Maine, revealed that the majority of the ducks seen were flushed from areas in which triangle spike rush was growing. Seventy-nine separate observations totaling 621 ducks, chiefly Black Ducks (*Anas rubripes*), but including a few Wood Ducks (*Aix sponsa*) and Ring-neck Ducks (*Aythya collaris*), were recorded during August, September, and October, 1946. Thirty-eight of these observations (385 ducks) were of birds among beds of triangle spike rush. At a typical observation recorded at 6:25 A. M. on August 16, thirty-one Black Ducks and two Wood Ducks were flushed from the emergent vegetation consisting of pickerel-weed (*Pontederia cordata*), duck potato (*Sagittaria latifolia*), horsetail (*Equisetum fluviatile*), and triangle spike rush (*Eleocharis robbinsii*). The site was littered with the freshly uprooted plants of spike rush from which the tubers (thickened portions of subterranean stems) and the more fleshy parts of the root had been stripped, leaving only the fibrous, tougher sections of the roots.

During October, 1946, four Black Duck stomachs were collected at the Davis-Holbrook area. Stomach analyses were based upon dry material. Food items found

[1] Contributions from the Maine Cooperative Wildlife Research Unit, Orono, Maine; Maine Department of Inland Fisheries and Game, University of Maine, Wildlife Management Institute, and U. S. Fish and Wildlife Service, cooperating.

were recorded according to the percentage-by-bulk method as practiced by the U. S. Fish and Wildlife Service. Assistance in the identification of food items was given by staff members of the botany and zoology departments at the University of Maine.

Tubers and fibers of triangle spike rush were found in each stomach, although only three seeds of this plant were recorded. Each of the four stomachs was nearly full of food and the major items of these, expressed as percentages, are as follows: triangle spike rush (*Eleocharis robbinsii*) 40.4; water bulrush (*Scirpus subterminalis*) 25.6; three square bulrush (*Scirpus torreyi*) 11.9; pickerel weed (*Pontederia cordata*) 6.7; yellow water lily (*Nuphar variegatum*) 3.1; insects and mollusks 7.8. Based upon both stomach analyses and field observations, the tubers are the portions of this plant that are most frequently taken by ducks.

It would be interesting to determine whether parts of this plant are taken at seasons other than late summer and autumn. Since triangle spike rush does not seem to exhibit undesirable dominance tendencies, and does produce tubers, its propagation might be desirable where management plans call for the encouragement of waterfowl food plants.—MALCOLM W. COULTER, *Maine Cooperative Wildlife Research Unit, Orono, Maine.*

Subspecific identities of some winter and transient birds from Virginia.—Examination of the bird collection of the Virginia Cooperative Wildlife Research Unit revealed several forms not previously reported for Virginia as well as others new to the respective collecting localities. Most of the specimens listed were collected by C. E. Addy, C. O. Handley, Sr., or C. O. Handley, Jr., and except where otherwise indicated, the specimens are contained in the collections of the Virginia Cooperative Wildlife Research Unit at Blacksburg, Virginia. Identifications were verified in all instances either by Dr. John W. Aldrich or Allen J. Duvall, U. S. Fish and Wildlife Service, Washington, D. C.

Parus atricapillus practicus (Oberholser).—Specimens from Alleghany Mountain (Highland Co.), Dec. 31, 1943, and Crabbottom (Highland Co.), June 9, 1938, are probably representative of local breeding populations, while specimens from Blacksburg (Montgomery Co.), Nov. 29, 1941, and Deerfield (Augusta Co.), Sept. 21, 1939, are transients. This subspecies has been infrequently recorded in Virginia away from its breeding grounds. All these specimens are typical of *practicus* which has not been recognized by the A. O. U. Committee on Nomenclature. *P. a. atricapillus* Linnaeus, has been recorded as a winter visitor in northern Virginia.

Troglodytes troglodytes pullus (Burleigh).—A transient specimen from Ironto (Montgomery Co.), Mar. 24, 1939, is new for the county.

Turdus migratorius nigrideus Aldrich and Nutt.—Blacksburg (Montgomery Co.), Feb. 27, 1939; a second record for the state. This specimen is a partial albino and has the breast white, with only a few traces of red. The back is dark, however, as in typical *nigrideus*.

Hylocichla guttata faxoni Bangs and Penard.—Specimens from Price's Fork (Montgomery Co.), Dec. 20, 1938, and Blacksburg (Montgomery Co.), Oct. 15, 1946, are typical *faxoni*, while a specimen from Haysi (Dickenson Co.), Feb. 20, 1940, is as pale as the western race *auduboni*, though not approaching it in size. Another specimen from Blacksburg, Oct. 22, 1938, is dark and like specimens from Newfoundland.

Hylocichla fuscescens fuliginosa Howe.—A specimen from Laurel Fork (Highland Co.), Sept. 22, 1943, is the first of this race to be recorded for Virginia. A specimen from Blacksburg (Montgomery Co.), Sept. 14, 1938, is typical *fuscescens*.

Geothlypis trichas brachidactyla (Swainson).—A Blacksburg (Montgomery Co.), Sept. 14, 1939, specimen is like birds in the National Museum from Ontario, while two others, Aug. 16, 1936, and Sept. 14, 1939, are like Nova Scotia specimens. Another Sept. 14, 1939, specimen is typical *trichas*.

Setophaga ruticilla tricolora (Müller.—A female collected at Blacksburg (Montgomery Co.), Sept. 13, 1939, is typical of *tricolora*, a race not currently recognized by the A. O. U. Check-List Committee. This form has not been reported previously from Virginia.

Passerculus sandwichensis labradorius Howe.—Virginia specimens typical of this race were examined from the following localities: Accomac Co. 1 (Fish and Wildlife Service); Arlington Co., 3 (U. S. National Museum); Fairfax Co., 1 (U. S. National Museum); Montgomery Co., 2 (Va. Coop. Wildlife Research Unit). Total, 7. Extreme dates: October 11 (Arlington, Arlington Co.)—November 12 (Chincoteague, Accomac Co.); April 5 (Four Mile Run, Arlington Co.)—May 27 (Blacksburg, Montgomery Co.). This subspecies has not been recorded previously for the state.

Passerculus sandwichensis mediogriseus Aldrich.—Specimens of this race, not recognized by the A. O. U. Check-List Committee, were examined from the following Virginia localities: Accomac Co., 1 (FWS); Brunswick Co., 1 (VCWRU); Essex Co., 1 (USNM); Fairfax Co., 1 (FWS); Montgomery Co., 3 (VCWRU); Total, 7. Extreme dates: October 29 (Blacksburg, Montgomery Co.)—November 13 (Chincoteague, Accomac Co.); March 3 (Charlie Hope, Brunswick Co.)—March 28 (Blacksburg, Montgomery Co.). Not previously recorded from Virginia. One specimen from Blacksburg approaches *nevadensis* in coloration.

Passerculus sandwichensis oblitus Peters and Griscom.—Three Blacksburg (Montgomery County) specimens are typical of this well-marked race which has not been reported previously from Virginia. Extreme dates: October 30—November 2.

Passerculus sandwichensis savanna (Wilson).—A total of 53 specimens of this race were examined from the following Virginia localities: Accomac Co., 3 (FWS); Arlington Co., 15 (USNM); Essex Co., 11 (USNM); Fairfax Co., 7 (5 FWS, 2 USNM); Montgomery Co., 6 (VCWRU); Norfolk Co., 1 (USNM): Northampton Co., 8 (USNM); Princess Anne Co., 1 (VCWRU); Pulaski Co., 1 (USNM). Extreme dates: August 22 (Cobbs Island, Northampton Co.)—winter—May 19 (Smiths Island, Northampton Co.).

Ammodramus savannarum perpallidus (Coues).—A specimen from Blacksburg (Montgomery Co.), Nov. 14, 1946, is typical of this western race. This is an unusually late date for the species at Blacksburg. This form has not been reported previously from Virginia. Other Blacksburg specimens (Oct. 29, 1946, Oct. 6, 1936, and June 7, 1941) are typical *pratensis*.

Melospiza melodia euphonia Wetmore. This is the breeding form in the western part of the State, but is apparently infrequent in winter. Specimens: Blacksburg (Montgomery Co.), Nov. 1, 1946; Nov. 8, 1946.

Melospiza melodia juddi Bishop.—Specimens from Blacksburg (Montgomery Co.), Mar. 22, 1941; Asberry (Tazewell Co.), Feb. 21, 1940; and Rocky Gap (Bland Co.), Feb. 22, 1940, are pale and like specimens from Wisconsin and the upper Mississippi Valley which have formerly been called *M. m. beata* Bangs. Following current nomenclature they must be classed with the darker *juddi*. This form has not been previously recorded for Virginia.

Melospiza melodia melodia (Wilson).—This is the common winter resident form in western Virginia, and specimens were examined from the following localities: Bedford (Bedford Co.), Oct. 17, 1938; Lyndhurst (Augusta Co.), Feb. 14, 1940; Grundy

(Buchanan Co.), Feb. 19, 1940; Blacksburg (Montgomery Co.), Oct. 15, 1938; Oct. 22, 1936; Nov. 12, 1938; Jan. 4, 1938; Feb. 13, 1941; Mar. 27, 1941; Apr. 9, 1938.

Melospiza melodia atlantica Todd.—A specimen from Virginia Beach (Princess Anne Co.), Nov. 2, 1939, is typical of the race.

Melospiza georgiana ericrypta Oberholser.—This form, which has not been recorded previously for the state, apparently outnumbers *georgiana* at Blacksburg (Montgomery Co.) in migration. Specimens: Nov. 12, 1938; Mar. 21, 1939; Apr. 10, 1939; Apr. 19, 1941. A single specimen, collected Oct. 17, 1938, is typical of *georgiana*.—CHARLES O. HANDLEY, JR., *Virginia Cooperative Wildlife Research Unit, Blacksburg, Virginia.*

The flight of the Greater Snow Goose in upstate New York.—On April 9, 1947, an unusual but welcomed flight of nineteen Greater Snow Geese (*Chen hyperboreus nivalis*), stopped at the New York State Conservation Department's Delmar Game Farm, near Albany, N. Y. These visitors were brought to earth and within range for easy identification during a blinding but short-lived snowstorm. They were standing within 150 yards of the observer and were close enough to the Canada Geese on the same field to allow a favorable comparison of size. Their stay was brief, lasting but about three-quarters of an hour from their first appearance at 7:45 A. M. After one short flight from an open, fall-plowed field, which was attempted during the heavy fall of snow, the birds returned to their first position on the ground. No movement of the birds was noted again until the snowfall had ceased and the visibility had increased to about one-quarter of a mile. The familiar V-flight was then formed and the geese began to wheel in a large half circle overhead. Their contrasting white and black plumage was then plainly visible as they disappeared through the falling snow.—STEPHEN C. FORDHAM, JR., *Delmar Game Farm, Delmar, N. Y.*

Recent northward penetration of the Reddish Egret in Florida.—The activities of the plume trade in the early part of this century all but wiped out the Reddish Egret (*Dicromanassa r. rufescens*) in Florida. Arthur H. Howell states in his Florida Bird-Life, page 104, that: "About 1890 this species seems to have almost disappeared from peninsular Florida, but more recently it appears to be returning in small numbers." He follows this with a few records during the years of 1906 and 1908; the latest he gives is the securing of a specimen by W. G. Fargo at Tampa Bay in March, 1927.

A decade and more passed before the bird was again noted in the state, and during one of his inspection trips to the Keys, in connection with Audubon work, the writer was privileged to see the first nest of this bird to be found in many years. It was discovered by a boatman from Tavernier (Key Largo) on Bottlepoint Key in April, 1938. On the 21st of that month, the writer saw and photographed the nest which contained two young. Since that year the Reddish Egret has been making a slow comeback in the Florida Keys, and specimens have been seen by a good many observers. However, apparently they have been confined to that region and have not appeared on the mainland, even at Cape Sable, the very Land's End of peninsular Florida.

It was, therefore, with keen interest that, during the 1947 season of the Audubon Wildlife Tours, conducted out of Okeechobee each year, the writer saw and watched a Reddish Egret for some time on February 22, 1947. With a party of eleven observers in two station-wagons, we saw the bird on the banks of the Kissimmee River, Highlands County, at the Pearce Ranch, near the bridge which crosses the River at

Bassenger. On February 25, during the next Tour, the bird was again seen at the same place, but on all subsequent trips (which lasted through March) it was not observed.

This is apparently the farthest northern record for the Reddish Egret in Florida for the past twenty years. Not since Fargo secured his specimen in the Tampa Bay region in March, 1927, has it been noted so far north. It is to be hoped that it is an indication that the species is getting its present foothold in Florida on a firm basis.—ALEXANDER SPRUNT, JR., *The Cresent, Charleston 50, South Carolina.*

New and unusual North Dakota trapping records.—In another paper (Bird-Banding, 1: 67–69, 1930), I discussed 'Some secondary results of bird-banding,' referring chiefly to migration data. The opportunities of securing unusual species are perhaps not appreciated by ornithologists who are not engaged in banding. The regular operation of a series of traps during migration seasons requires considerable time which may seem unprofitable. In my own case I have found that the frequent visits to the traps provide regular, short field trips which would not otherwise be made. The traps are located about one-fourth mile distant and thus frequent though brief observations are secured. The traps are constantly awaiting birds which drift through, and while various species are not equally susceptible of capture, many birds are taken which would be unlikely to be seen without trapping unless considerable time were spent afield.

To my own results I am able to add those secured at the stations of Mr. and Mrs. W. E. Brentzel of Fargo and Mrs. Hannah R. Gray of Wilton, N. D. Both of these are backyard stations, though both are near the edges of the towns. I find that no unusual records were secured at my station until about 1933 when water traps were in operation. The Brentzel station covers the period since 1933, and has been operated a greater proportion of the time than have either of the others. Mrs. Gray's station has been operated since 1931; the figures here extend to 1945, inclusive. A general report on my own station has been published (Bird-Banding, 15: 139–144, 1944).

1. WINTER WREN (*Troglodytes troglodytes*).—One on Oct. 8, 1938, is the only positive record by Stevens.

2. MOCKINGBIRD (*Mimus polyglottos*).—Mrs. Gray banded one at Wilton on June 3, 1943.

3. WILLOW THRUSH (*Hylocichla fuscescens salicicola*).—This bird nests regularly in suitable localities, but captures are rare. Comparative numbers of the different thrushes banded have been as follows:

	Brentzel	*Gray*	*Stevens*
OLIVE-BACKED THRUSH	149	581	214
GRAY-CHEEKED THRUSH	16	189	67
HERMIT THRUSH	19	26	84
WILLOW THRUSH	5	21	9

4. TOWNSEND'S SOLITAIRE (*Myadestes townsendi*).—Two birds banded by Mrs. Gray, October 7, 1937, and Aug. 29, 1943; one by Stevens, Oct. 1, 1946. So far as I know it has not previously been reported for North Dakota.

5. BLUE-HEADED VIREO (*Vireo solitarius*).—Not a rare species, but uncommon. Mrs. Gray banded one Sept. 3, 1945, and one Sept. 6, 1944; Brentzel one Sept. 12, 1944; Stevens four: Sept. 10, 1933, May 19, 1935, May 28, 1940, and Sept. 4, 1940.

6. PHILADELPHIA VIREO (*Vireo philadelphicus*).—I believe this had not been recorded for the State, but I banded two: May 24, 1940, and May 27, 1945; Brentzel one: Sept. 16, 1937; Gray two: Sept. 6, 1944, and Sept. 3, 1945.

7. Nashville Warbler (*Vermivora ruficapilla*).—I do not know that this has been previously reported. It evidently is not common. Stevens's records show 40 birds banded as compared with 407 Orange-crowned Warblers (*Vermivora celata*). Mrs. Brentzel reports 46 and 36; Mrs. Gray, 7 and 403, respectively. Birds in fall plumage are often puzzling but well-marked individuals are occasionally taken.

8. Parula Warbler (*Parula americana*).—Stevens banded one Sept. 10, 1933, and a pair May 17, 1935; no others seen. Mrs. Gray banded two: May 18, 1935, and Sept. 15, 1939.

9. Black-throated Blue Warbler (*Dendroica caerulescens*).—A rare species. Stevens records five: Oct. 21, 1938, Sept. 14, 1939, Oct. 23, 1944, Sept. 17, 1945, Sept. 22, 1946; Brentzel two: Sept. 30 and Oct. 5, 1938; Mrs. Gray five: Oct. 4, 1939, Sept. 23, 1944 (2), Sept. 26 and 27, 1944.

10. Black-throated Green Warbler (*Dendroica virens*).—Rare. Stevens banded only one, May 7, 1935, but has seen them occasionally. Mrs. Gray banded one, Sept. 4, 1937.

11. Chestnut-sided Warbler (*Dendroica pensylvanica*).—This well-known species is rare in North Dakota. Stevens banded five birds and has seen fewer than that in the open. Mrs. Gray banded one May 20, 1934, and one Sept. 24, 1935.

12. Chat (*Icteria virens*).—The Long-Tailed Chat (*I. v. longicauda*) is a common summer resident along the Missouri River, but rare eastward. Stevens banded a Chat May 17, 1936, one Oct. 11, 1938, and two Oct. 1, 1942, but has not seen them in the open. Brentzel saw one in the yard. Mrs. Gray has banded 129; her latest date is Sept. 18.

13. Orchard Oriole (*Icterus spurius*).—Not uncommon, and rather regularly seen in some localities. Stevens banded two: Sept. 10, 1933, and Aug. 26, 1942; Brentzel two: Aug. 16, 1942, and one July 14, 1934. Mrs. Gray has banded 17.

14. Scarlet Tanager (*Piranga olivacea*).—Occasionally seen. Stevens banded two: Oct. 2, 1935 and Sept. 17, 1939.

15. Indigo Bunting (*Passerina cyanea*).—Can usually be found in certain locations at Fargo. Stevens banded seven: May 27, 1930, Sept. 24, 1935, Sept. 3, 1940, Sept. 17, 26, 28, 1943, May 30, 1946. Only one of these was seen in the open in the trapping area. Brentzel banded two: Sept. 26, 1944 and May 25, 1946. Mrs. Gray has not taken them but has banded 76 Lazuli Buntings (*Passerina amoena*).

16. Evening Grosbeak (*Hesperiphona vespertina*).—A rather rare winter visitant. Stevens banded one Oct. 27, 1935. They are usually seen when traps are not in operation. Gray banded three: Oct. 12, 1935, Sept. 8, 1938, and Oct. 29, 1944.

17. Pine Grosbeak (*Pinicola enucleator*).—Mrs. Gray banded two, Apr. 17, 1939, and Nov. 8, 1946. Stevens saw them once in the trapping area.

18. Red Crossbill (*Loxia curvirostra*).—An uncommon species. Mrs. Gray banded one, July 27, 1933. Stevens banded 22 from Sept. 22 to Oct. 14, 1931; three Sept. 2, 1935; one July 29 and two Aug. 18, 1937. These all were attracted to sunflowers in the backyard. In 1931 a large flock of the birds was seen at various sunflower plantings in the Fargo-Moorhead area.

19. White-winged Crossbill (*Loxia leucoptera*).—A rare winter visitant. Stevens banded one Oct. 23, 1946. Four or five were seen ten days later. Adrian Fox banded one at Park River, N. D., Oct. 25, 1937.

20. Golden-crowned Sparrow (*Zonotrichia coronata*).—Mrs. Gray banded one, June 14, 1934. She is perfectly familiar with the other crown sparrows and writes: "I compared it very carefully with Taverner's description [Birds of Western Canada]. It had the yellow crown stripe, distinctly."—O. A. Stevens, *North Dakota Agricultural College, Fargo, N. Dakota.*

Montana Junco in New York.—On December 6, 1946, Mr. F. Clement Scott brought to the American Museum of Natural History for identification a Junco which he believed belonged to the *oreganus* group. The bird had been secured at a banding station in Poundridge Township, Westchester County, New York. It had frequented the station for several days, associated with a wintering flock of *J. hyemalis*. The specimen, which is now No. 344035 in the collection of the American Museum of Natural History, is a male with a wing measurement of 80 mm. and tail, 68. The head is very dark; dorsally it is black, and ventrally, chaetura black. The hood is sharply differentiated from the back. The back is hair brown and the sides, army brown. The percentage of white in the rectrices is as follows: No. 6—100, No. 5—85, No. 4—20, No. 3—0. The specimen, a particularly dark bird, is identified as *J. o. montanus* of the northern division as defined by Dr. Alden H. Miller. To confirm the identification a comparison was made with some of the darkest examples of *montanus* in the collection of the Museum of Vertebrate Zoology which were kindly loaned by Dr. Miller. The agreement is particularly close.

The study of this bird has led to the examination of other eastern records of *J. oreganus* in an attempt to determine which form or forms of this group wander so far from their breeding grounds.

Most of the well-substantiated records are from Massachusetts, and Mr. Ludlow Griscom of the Museum of Comparative Zoölogy, who is quite familiar with all of these specimens, has been kind enough to give me the benefit of his opinion regarding them. The oldest of these specimens is a female taken on March 25, 1878, and is now in the New England Museum of Natural History. The bird has been identified as *montanus* of the 1931 Check-List but this identification is rather uncertain as is often the case with single females of the genus. It well may be *cismontanus* or one of many of hybrid origin.

At Wellesley, Massachusetts, an adult male was taken on January 28, 1919. In connection with this specimen Mr. Griscom states: "This bird is definitely *shufeldti* of the last A. O. U. Check-List and is consequently *montanus* of Miller's northern division." The specimen is mounted and is on exhibition at the New England Museum of Natural History. In the same category is a male collected by Dr. C. W. Townsend at Ipswich, Massachusetts, on January 30, 1931. Mr. Griscom advises that this, too, is *montanus* of the northern division as defined by Dr. Miller. The specimen is now in the Peabody Museum at Salem, Massachusetts.

In the winter of 1941–1942, an Oregon Junco appeared at a feeding station at Danvers, Massachusetts, and spent several months there with a flock of *J. hyemalis*. Mr. Griscom could not obtain permission to collect the bird but did succeed in trapping and banding it. While in the hand the bird was compared with a carefully selected series of males of different races and it was determined to be of the same race as the two preceding specimens.

On February 25, 1932, a specimen of *J. oreganus* was collected at Branchport, Steuben County, New York, by Mr. C. F. Stone. The skin was sent to the United States National Museum and identified as *J. o. shufeldti*. Through the kindness of Dr. Herbert Friedmann this skin was borrowed and examined. It is *montanus* as defined by Dr. Miller.

Normally, subspecific determination within this species might not be considered valid without a specimen but, when the observation is backed with the long field experience of Mr. Aretas A. Saunders, the record must be given all of the weight that any sight record can have. At Mr. Saunders's feeding station at Fairfield, Connecticut, on December 9, 1939, an Oregon Junco appeared and continued as a regular

visitor until April 15, 1940. The bird fed with a flock of Slate-colored Juncos and was often observed at a distance of no more than three feet. Mr. Saunders has given a detailed description of the bird and, based on his great familiarity with the western juncos, has called it *montanus*. Two years later, a junco came to this same feeding station for one day only, but Mr. Saunders is quite certain that it was the same bird, for the description tallied exactly with that of the former visitor and the bird seemed to act as if it were quite familiar with the station.

It is a rather striking fact that, whenever a bird of the *oreganus* group reaches the East, it appears to be *montanus*. This race seems to have a greater tolerance for diverse conditions of environment than others of the group and so may wander more freely than the others, and, too, from the northern breeding ground of this race, the northern coniferous forest stretches eastward to form an almost unbroken and easy pathway to the East Coast.

I am deeply grateful to Dr. Miller, Mr. Griscom, Dr. Friedmann and Mr. Saunders for the material and information which they have so graciously provided.—CHARLES K. NICHOLS, *American Museum of Natural History, New York 24, N. Y.*

Escaped paroquets found breeding in Florida.—In April or May, 1926, the late Charles E. Doe, Curator of Birds at the University of Florida, found three pairs of paroquets which he said were the Carolina Paroquet, in Grapevine Hammock, on the Kissimmee Prairie, Okeechobee County, Florida. Later he returned to this same hammock and found two paroquet nests, both in holes in living oaks. In one nest were three eggs and in the other, two eggs which he collected and labeled as eggs of the Carolina Paroquet. Shortly after finding these three pairs of birds and taking the two sets of eggs, he told me the story. He never, so far as I know, collected any birds; he certainly would have mentioned it to authenticate these eggs. In December, 1946, I visited the Museum at Gainesville, Florida and Doe showed me the set of three eggs which certainly are those of some species of paroquet—white and without luster. He told me that he sold the set of two to a Mr. Parsons of Providence, R. I.

It perhaps can never be definitely known, whether he collected genuine sets of the Carolina Paroquet or the eggs of an escaped species of paroquet imported from outside the United States, but the probabilities are that the latter is the case, since there was reported from Miami an escape of Mexican Paroquets which were seen in the wilds by several observers. Quite possibly it was this species which he discovered breeding, but this is only my assumption.

It is unfortunate that specimens of the breeding birds were not collected so as to leave no doubts as to the identity of these two sets. I know of no other breeding records for either the Carolina Paroquet or escaped introduced species of paroquets in Florida.—DONALD J. NICHOLSON, *Orlando, Florida.*

Fresh-water nesting of the Gull-billed Tern in Florida.—In Howell's 'Florida Bird Life' he does not mention the Gull-billed tern (*Gelochelidon nilotica aranea*), as a breeder but as a rather rare visitor. Thus it was a great surprise when I found it nesting in numbers on Lake Okeechobee, on seven islands, in May and June, 1943. While studying the birds of that region on May 7, 1943, Wray H. Nicholson and Donald J. Nicholson, found four or five nests; one with two fresh eggs and the balance with a single fresh egg each. The birds were just commencing to breed on three small grassy islands bordered with a narrow fringe of sandy beach. The nests were made of debris and were quite elaborate. Again on June 7, 1943, we visited this lake and found scattered colonies on seven islands as widely apart as 30 miles. Fully 85 to 90 nests were seen, the majority with three eggs each, others with two and

single eggs each, and a number ready for sets. No eggs had yet hatched. On two islands close together not less than 75 pairs were nesting, and among them were a few nests and eggs of the Least Tern (*Sterna antillarum antillarum*), and Black-necked Stilts.

This is the first fresh-water breeding record for this rare tern in Florida, and there is but one other fresh-water breeding record, that of Texas. Elsewhere in Florida this tern has been reported breeding in but two localities—Mosquito Lagoon by R. L. Longstreet and near Pensacola by F. Weston; and at both places few nests were found. These constitute the only actual nesting records for the Gull-billed Tern in the state. Elsewhere in the state I saw one of these terns near Narcoosee on a canal in April, 1945, and a dozen birds several different times flying over the brackish marshes seven miles west of Indian River City, Brevard County, and on the Indian River at Titusville, in May and June of 1944 and 1945.

Two specimens of breeding Gull-billed Terns found at Lake Okeechobee were presented to the U. S. National Museum, and were identified by Dr. Alexander Wetmore.—DONALD JOHN NICHOLSON, *Orlando, Florida.*

Wintering of the Gray Kingbird in Florida.—On January 30, 1945, a Gray Kingbird (*Tyrannus dominicensis dominicensis*) was seen silently feeding on a small farm at Lakeport, Glades County, Florida, which village is located on the western border of Lake Okeechobee. The bird was watched for some time by Wray H. Nicholson and Donald J. Nicholson. When finally it was shot, a skin was made of this unusual specimen, which later was presented to the U. S. National Museum. The bird was silent during the time it was observed. In Bent's 'Life Histories of North American Flycatchers, Larks, Swallows, and their Allies,' on page 49, Mr. Alexander Sprunt, Jr., is quoted: "It is by no means impossible that it may appear in the future, but the probability is that any bird seen after December 1 is a belated migrant and not a wintering specimen." It is difficult to imagine that the bird found as late as January 30 and apparently well-established *miles from salt water* could be classified as anything *but* a wintering bird, especially since the species appears each spring in April—a period of about two months later. Therefore it should be considered, under the circumstances, as our first authentic specimen of a wintering bird. It is odd that it should be found 40 to 50 miles inland on fresh water.

According to Sprunt, Dr. H. C. Burgess saw a Gray Kingbird at Royal Palm Park, December 26 to 28, 1917, indicating that the species does occasionally winter in southern Florida. With these two definite winter records, further debate regarding a wintering status is superfluous.—DONALD JOHN NICHOLSON, *Orlando, Florida.*

Curlew Sandpiper on Galveston Island—On April 13, 1947, when Mr. and Mrs. Charles W. Hamilton, my son Stephen, and I were driving along the beach of Galveston Island, we noticed, among a flock of Sanderlings feeding on the beach, a Greater Yellowlegs and a strange, dark-appearing bird. The Yellowlegs flew away at our approach, but the Sanderlings and the other bird remained. When frightened by our coming too near, this bird would fly off with the Sanderlings and settle with them a few yards down the beach. We examined it repeatedly during about 40 minutes with 18× Zeiss binoculars, as well as 8× Bausch & Lomb binoculars, from a distance of about 50 yards. It was a tall, rangy bird (much taller than the Sanderlings) that reminded one of a Stilt Sandpiper. The head, neck, and breast were red with a grayish tint; the back and wings were grayish brown, so that the bird looked quite dark; the brown of the back (plainly visible every time the bird flew away)

faded into what looked like a light, grayish tan above the tail; the tail was grayish brown; the region under the tail and behind the legs was visible every time this tall bird tipped over to pick up food, and was pure white; a white wing-stripe was visible when the bird flew.

I am very familiar with the ordinary shore-birds of the Gulf Coast, and I know well the short-legged Red-backed Sandpiper, the chunky Knot, and the long-billed Dowitcher. This bird could not possibly have been any of these three. It was certainly a Curlew Sandpiper.

A few remarks on the appearance of this bird in comparison with some familiar illustrations in various ornithological texts may help other observers identify the species more frequently than in the past. The bill looked precisely like that in Audubon's picture of the species; the more pronounced curvature shown in Ridgway, Peterson, and Taverner's Birds of Canada was not apparent in this bird. (Is it possible that the bill shrinks into a different form in dried specimens?) The legs were much darker than Audubon has them, and were longer than those of his bird in breeding plumage; the legs of his bird in winter plumage seem to have about the right proportions. The bird was more slender (like a Lesser Yellowlegs or a Stilt Sandpiper) than Peterson's drawing suggests; and the light area above the tail seemed neither so white nor so sharply defined as in Peterson's figure. In the living bird this area seemed merely to have a dirty, cream-colored wash. The red of the fore parts had a more smoky look than in Audubon's picture. These inconsistencies of coloration may have been seasonal since, at that time of year, a change from winter to summer plumage was doubtless occurring. The incomplete wing-stripe of this bird is perfectly depicted in Peterson.

The Curlew Sandpiper is a Eurasian species that was recorded with some frequency along our northeastern coasts during the market-hunting days of the nineteenth century; and it has been recorded in the Lesser Antilles and in Patagonia. Bent (1927) gives 1904 as the last date for the United States. I believe that it has not been reported hitherto from our Gulf Coast.—GEORGE G. WILLIAMS, *The Rice Institute, Houston, Texas.*

Hooded Merganser nesting in Massachusetts.—Last spring (on May 14, 1946), I saw a Hooded Merganser with seven tiny young swimming close to the shore on the Quabbin Reservoir in Dana, Massachusetts. (Dana is now a ghost town, since its area has been claimed by the town of Petersham. The Quabbin Reservoir, the largest domestic supply reservoir in the United States, is in Dana and six or eight other real and ghost towns in central Massachusetts.) The young had the markings of downy young Hooded Mergansers and were not foster young of some other species of duck. I made other trips out there, but the only two times that I saw any of them after that was on July 4, when I saw all eight—the young then almost the size of their mother, and July 17, when, in company with John J. Monahan of Spencer, a photographer, and Oscar L. Cregan of Spencer, a game warden, I saw just one. All of these were seen in Dana on the Quabbin Reservoir. I had heard somewhere of people putting out houses for the American Merganser and had put out two houses for them the previous fall. On the ground at the foot of one of the houses was a very small amount of excrement, but there was nothing inside either of the houses. I do not feel sure that the ducks nested in one of these houses, but since the young were only about a day old the first day I saw them and since the Quabbin Reservoir is entirely in Massachusetts, I feel sure that they nested in Massachusetts. Upon inquiry, I heard of two other nestings of the Hooded Merganser in Massachusetts in the last twenty years, one also in Dana and the other in Harvard on the Nashua

River. I have put out two other houses and I hope the mergansers come back and start nesting there also.—DAVIS H. CROMPTON, *Worcester, Massachusetts.*

Black Skimmer and White Pelican in the Bahamas.—While visiting Bimini Island of the Bahamas, from March 4 to 8, together with Dr. Charles M. Breder of the Department of Fishes of the American Museum of Natural History, I observed, among other birds, two Black Skimmers (*Rynchops nigra nigra*) and one White Pelican (*Pelecanus erythrorhynchos*). Neither of these birds has been previously reported, to my knowledge, from Bimini. Bond's Birds of the West Indies and Riley in his list of the birds of the Bahamas, do not mention these two species as occurring at Bimini. Presumably both birds occur there irregularly, and the probable reason they have not been previously reported is because nobody resident on the island is familiar with the local birds or the migrants.—RALPH FRIEDMAN, *New York, N. Y.*

Additional occurrence of the White-eyed Vireo in Canada.—Publication of Farley Mowat's list of six occurrences of the White-eyed Vireo (*Vireo griseus*) in Ontario, Canada (Auk, 64: 138–139, 1947) prompts me to record the following more recent occurrence.

Perhaps I should begin by stating that I became familiar with the White-eyed Vireo and its song near Sag Harbor, Long Island, New York, in 1910, but did not see an individual of this species again until I made the following observation, twenty-nine years later. About 9:45 a. m. on May 11, 1939, as I was walking through the woods on Fishing Point, Pelee Island, Ontario, in Lake Erie, I heard and recognized the frequent, distinctive song of a White-eyed Vireo. Without difficulty I found the singer in an isolated clump of shrubbery. As I waited, the bird moved to the top of the clump, where it perched in plain sight in excellent sunlight, about 15 feet from me, and sang repeatedly while I observed it at leisure through a 6-power binocular. I saw clearly its characteristic size, greenish olive upper parts, yellow flanks and loral area, white wing-bars and white iris.—HARRISON F. LEWIS, *Ottawa, Canada.*

Southernmost penetration of the Starling in the East.—In all of the continuing spread of the Starling (*Sturnus v. vulgaris*) throughout the East and South, to say nothing of the West, there has, hitherto, been one section of the southeast which has remained free of this introduced Old-World species; that is south-central Florida. Efforts on the part of the writer have failed to reveal a single occurrence of this bird south of a line drawn from Tampa (west coast) to Melbourne (east coast). He has, for the past twelve years done a great deal of field work in the southern and central portions of the state, not only in the sanctuary supervision of the National Audubon Society's refuges, but also in conducting the Audubon Wildlife Tours, now in their fifth year, from Okeechobee, each February and March.

Not since 1935, when I began work in the Lake Okeechobee-Kissimmee Prairie region, has a single Starling been observed until this last season. On February 10, 1947, after the second freeze of that extraordinary month in meteorological history, while I was conducting Trip No. 3 of the Audubon Tours, an adult Starling was seen and watched by the entire group of ten persons. The bird was perched on a telephone wire along the road running from the Seminole Indian Reservation to Brighton, in Highlands County, one mile south of Brighton. It was in company with Red-winged Blackbirds and was watched at a range of about twenty feet. The group, composed of visitors from the north, all of whom were familiar with the bird, would never have given it a second glance had it not been for the excitement of the writer

at seeing it!! On being told that they were seeing the southernmost Starling, they looked at it with more than ordinary interest! This statement was made on the spur of the moment, but all subsequent efforts to trace any previous occurrence have proved unsuccessful.

The writer has communicated with such authorities as Messrs. R. J. Longstreet, Daytona Beach; Louis Stimson, Miami; and Donald J. Nicholson, Orlando. None of them have any record of the Starling south of the limits outlined above. Mr. Longstreet edits the Florida Naturalist and would be, perhaps, in the best position to know of any southern records. So it appears that the last area in the East and South has now been penetrated by this species. Whether the extreme cold of early February was a factor remains to be seen, but on all subsequent trips (there have now been nine of them) no sign of the bird has been noted. Presumably it is the forerunner of others to come.—ALEXANDER SPRUNT, JR., *Okeechobee, Florida.*

Scissor-tailed Flycatcher in Florida.—On October 27, 1946, I saw two Scissor-tailed Flycatchers sitting on a wire near the heart of Clewiston, Florida. They remained resting while I had ample time to remove my binoculars from the case and observe the birds at close range. I have lived in this area since early in 1941 but this is the first time I have seen this species in Florida.—WILLARD E. DILLEY, *Clewiston, Florida.*

Sooty Shearwater in western North Carolina.—While vacationing in the Blue Ridge Mountains, the writer stopped at the store of Mrs. W. C. Irwin of Sparta, Alleghany County, and was attracted to a mounted specimen of *Puffinus griseus*. This shearwater was blown into the town of Twin Oaks in August, 1939, after a storm on the coast. It is about 300 miles from here to the Atlantic coast.—W. H. BALL, *4311 W. Knox Rd., College Park, Maryland.*

The American Egret in New Brunswick.—There are records of at least nine of these birds (*Casmerodius albus egretta*) which have wandered north to New Brunswick during the last seventy-five years. These have appeared not only in late summer, as the numerous published reports that they wander north after the breeding season would lead us to expect, but have been recorded from early April until November.

James W. Banks, in manuscript notes discovered at the New Brunswick Museum, stated that a pair were seen many times during the summer of 1870 in the vicinity of Gagetown, Queens County, New Brunswick. Ruthven Deane in the Bulletin of the Nuttall Ornithological Club (1879), quoted C. J. Maynard, who told him about examining an immature specimen shot at White Head Island, Grand Manan, November 3, 1878. Dr. Philip Cox, for many years Professor of Natural History at the University of New Brunswick, described one of these birds to the writer which he had seen many years ago at Maugerville, Sunbury County. This is our most northerly record.

Ora W. Knight (1897) stated that G. A. Boardman had one in his collection which was taken at Grand Manan but no date is given. There is a specimen without data in the Boardman Collection at the New Brunswick Museum to-day which may be the one referred to by Knight.

Olin Sewall Pettingill, Jr. (1939) gave two new records for the American Egret in the Grand Manan Archipelago. One was found dead on Hay Island, April 5, 1936, and another was collected at North Head, Grand Manan, April 12, 1930. The latter is now in Allan Moses's collection.

The most recent record for Grand Manan is one which, according to a press report, was seen at Ingall's Head in June, 1945, by Mrs. C. W. Green.

During August and September, 1945, an American Egret was seen frequently on the Red Head Marsh in Saint John County, a few miles east of the City of Saint John. I saw this individual on September 1, 1945, at a distance of about 100 yards when the yellow bill and black legs were very distinctly visible.

It should be noted that, out of these nine records, only three, and these very early and possibly indeterminate, are north of the Bay of Fundy shore and all are in the southern section of the province.—W. Austin Squires, *Natural Science Department, New Brunswick Museum, Saint John, N. B.*

Waxwings at Columbus, Nebraska.—In the forenoon of March 7, 1947, Mrs. Anderson, while walking through the City Park in Columbus, Nebraska, saw a great number of Cedar Waxwings. Upon my arrival in Columbus the same afternoon, Mrs. Anderson immediately mentioned seeing the Cedar Waxwings. I was not long in getting over to the City Park and sure enough there they were, several hundred of them, feasting on hackberries. Even in that short time the grounds and walks were covered with fresh pits from the berries. Waxwings were everywhere. A great number had their fill and were on the ground drinking from small snow-water pools; those close to me I could touch with my hand. I noticed quite a sprinkling of Bohemian Waxwings with this large number of Cedar Waxwings; however, the Bohemian Waxwings were in the tree-tops and none were on the lower limbs or the ground. I noticed one lone Robin feeding on hackberries that seemed to sense its winter supply of hackberries fast disappearing.

A week later, March 14, I drove to Columbus and found the Waxwings still there but they had moved on to the older residential district and were in larger hackberry trees that were filled with even more waxwings than on my first visit; the number had increased to over a thousand birds. By far this was the greatest showing of waxwings I ever had the pleasure of seeing, with the best crop of hackberries waiting for them. The Bohemian and Cedar Waxwings being in the same group gave me an excellent opportunity to study and compare the difference in sizes, markings and colorings of the two species.—Dana Anderson, *Saint Edward, Nebraska.*

Wood Ibis in western New York.—On April 12, 1947, about 10:00 A. M., I was watching a flock of twenty-two Whistling Swans that had alighted on the flooded flats between routes 36 and 63, just east of cross-road no. 258 which leads into Groveland, New York. I trained my field-glasses on the sky and noticed what I thought was a Great Blue Heron. I would have dismissed this with the remark, "The Great Blues are back," when I noticed the bird circling. I thought that it was going to alight, but no treetop was near. It continued its flying and sailing and I noticed the head and neck leading. This behavior on the part of a Great Blue Heron puzzled me, so I continued to watch. Suddenly the bird's back was struck by the sunlight and I saw that the back was white and the wing-tips were black for some distance, showing that it could not be a Great Blue Heron. I saw the back three times before the bird glided from view. From Peterson's book I identified it as a Wood Ibis.— Helen R. Braem, *Sonyea, New York.*

Three new subspecies for Ohio.—A thorough reëxamination of the birds in the collection of the University of Cincinnati Museum (about 1000 skins and mounted specimens) has been made for the purpose of reclassifying and cataloging. Careful study of certain specimens has revealed the occurrence of three subspecies, previously unrecognized in the collection, which are new records for Ohio. In each case the determination of the authors has been supported by an impartial expert opinion. The pertinent details of the three cases are presented below.

SOUTHERN ROBIN, *Turdus migratorius achrusterus*

Specimen 4489—male. Collected at Williamsburg, Ohio, by H. L. Wieman, September, 1902.
Specimen 4490—not sexed. Collected at Cincinnati (College Hill), Ohio, March 18, 1909.
Specimen 4877—immature, not sexed. Collected at Cincinnati, June 1, 1908.
Specimen 4878—immature, not sexed. Collected at Cincinnati, June 2, 1908.

These four specimens, together with two others without data but presumably from the Cincinnati area, have been identified as this form by H. C. Oberholser, Cleveland Museum of Natural History. In addition, several specimens found dead in Glendale, Ohio, during the last two years and now in the private collection of Nat Whitney, Jr., Glendale, belong to this race. In 'Distribution of the Breeding Birds of Ohio' (Ohio Biological Survey, Bulletin 32, vol. 6, no. 3: 164, 1935) Lawrence E. Hicks says, "individuals breeding in extreme southern Ohio show some tendencies toward the characters of the southern form." It appears that we have evidence that the situation is more definite than suggested by Hicks.

These specimens establish the presence of this subspecies as a breeding form in Ohio as long as forty years ago as well as recently. This raises the question of the relative position of the Eastern and Southern Robins as breeding or migrant forms within the Ohio Valley, a problem which has not been studied. Additional collecting of breeding birds in this area will be necessary to determine the numerical status of the subspecies.

NEWFOUNDLAND YELLOW WARBLER, *Dendroica petechia amnicola*

Specimen 4744—male. Collected May 9, 1890.
Specimen 4745—female. Collected May 14, 1890.
Specimen 4746—female. Collected April 29, 1890.

All three specimens were collected at Lebanon, Ohio, by Raymond W. Smith.

Through the kindness of John W. Aldrich, U. S. Fish and Wildlife Service, the specimens were identified by Mr. A. Duvall. Concerning these specimens Dr. Aldrich writes in a private communication: "A check of my records shows that I have not previously identified specimens of *Dendroica petechia amnicola* from Ohio. However, I have not looked over any Ohio collections with this distinction in view."

This race must be regarded as migratory in Ohio; the breeding form is *Dendroica petechia aestiva*. The numerical status of the Newfoundland race in Ohio is unknown. A reëxamination of Ohio specimens and additional collecting throughout the state during the migration season is required for more complete data.

MARYLAND YELLOW-THROAT, *Geothlypis trichas trichas*

Specimen 4987—male. Collected at Cincinnati, Ohio, by A. B. Covert, July 20, 1907.

This specimen was identified as belonging to this race by H. C. Oberholser, Cleveland Museum of Natural History, who writes in a private communication that he knows of no other record of this form for Ohio. A check of available collections has failed to locate any yellow-throats collected during the breeding season in the Greater-Cincinnati region. Therefore, no statement concerning the status of this form in Ohio is possible until adequate collecting of breeding birds has been done.—EMERSON

KEMSIES AND WILLIAM A. DREYER, *Department of Zoology, University of Cincinnati, Cincinnati, Ohio.*

Northern Pine Siskin in Hamilton County, Ohio.—Specimen 5047—female. *Spinus pinus pinus*. Collected along the Great Miami River, four miles west of Cleves, Hamilton County, Ohio, by Emerson Kemsies, April 3, 1947.

This is the first collected specimen and the only record for Hamilton County since Charles Dury reported the form as "abundant in the winter of 1868–69." The specimen was shot out of a mixed flock of Siskins, Purple Finches and Eastern Goldfinches. It was feeding on the flower buds of a slippery elm. The Siskin has been reported in considerable numbers by various observers in adjacent areas during the winter of 1946–1947.—EMERSON KEMSIES, *Deaprtment of Zoology, University of Cincinnati, Cincinnati, Ohio.*

***Limnodromus semipalmatus* in Arabia.**—While I was stationed at Sharjah, Trucial Oman, Arabia, on the south shore of the Persian Gulf, 450 miles southeast of Abadan, Iran, I made two observations of the dowitcher (*Limnodromus semipalmatus*). In the literature the bird is variously called "dowitcher," "semipalmated snipe," and "snipe-billed godwit." On March 12, 1945, I saw approximately 25 of these birds feeding in the shallow water of an inlet known as "Sharjah Creek." In my notes at that time I wrote: "The same in every respect as the American Dowitcher . . ." Upon my return to the area on March 16, I saw none; but on March 21, more than 100 were present, scattered over several acres of mudflats. On this occasion I noticed that they were large, substantially larger than the numerous Redshanks (*Tringa totanus*) with which they were associated. They were very tame, and permitted close approach time after time. I made several sketches of their markings.

Peters (Check-List of Birds of the World, 2: 273) gives the known winter range of the species as, "On migration and in winter to China, Japan, northern India, Burma, and Indo-Chinese countries."

Unfortunately, I was unable to collect specimens. Since returning to the United States, I have examined the specimens of this species in the Museum of Comparative Zoölogy at Cambridge, Massachusetts, as well as all the rest of the Scolopacidae known to occur in the area. I have absolutely no doubt that my identification was correct. It seems worth while to record this observation for what it is worth, as it represents a considerable range extension, and may possibly stimulate future verification by the collection of specimens. I am indebted to Mr. James Lee Peters for permission to examine the material in the Museum of Comparative Zoölogy.—ROBERT M. MENGEL, *Cornell University, Ithaca, New York.*

Bohemian Waxwing at Boothbay, Maine, in July.—One afternoon during the latter part of July, 1944, I was seated about 50 feet from a large clump of honeysuckle bushes near the barn in my summer place in Boothbay, Maine, watching a flock of about 20 Cedar Waxwings feeding upon the red berries the bushes bore. I was using 8-power binoculars which brought the images very close, and was suddenly startled to see a large head appear above the leaves. As the whole body appeared I realized it was a very large waxwing. The bird was about the size of a Robin, its breast was a little duller than that of its smaller brethren, but the yellow band across its tail was identical. Its crest was pronounced and its wings had a little more white on them. Its flight was the same undulating flight of the smaller birds.

When I went back to Boston I called Mr. Charles Townsend, son of the famous Dr. Townsend, who immediately identified the bird as a Bohemian Waxwing, rather

rare in this area. He suggested that I go to the Audubon Society and confirm his identification. This I did, and there was no doubt in the curator's mind as to the correctness of Mr. Townsend's finding.

In 1945 there was no appearance, but on July 20, 1946, the waxwings appeared in full force in the same bushes, and this time my wife saw the Bohemians first. We were seated in about the same position from which the first observation was made, when she suddenly exclaimed: "Three large Waxwings have just entered the bushes." I picked up the glasses, and sure enough, three Bohemians were there. They kept to themselves and as far as we know made no sound. They stayed off and on about a week, and then disappeared.—B. Howe, *Boothbay, Maine.*

[Mr. Henry Thurston writes that Mr. and Mrs. Howe "were both familiar with the recognition marks of both Waxwings and I would vouch for their record being OK."—Ed.]

Barometric pressure-patterns and spring migration.—Observations made by the writer during the spring of 1947, and analyses supplied by Miss Margaret Whitcomb, research associate in Meteorology at the Massachusetts Institute of Technology, suggest strongly that there is a particular barometric pressure-pattern in North American weather which stimulates spring migration into New England and adjacent sections of the Northeast.

The ideal pattern is well indicated on the U. S. Weather Bureau's map for 1:30 A. M. on April 6, 1947, wherein a high pressure area is moving eastward off the southeast U. S. coast, while a low pressure area is moving into the Great Lakes region after having originated in the vicinity of Kansas and Colorado.

The favorable situation prevailing on April 6, 1947 (and other dates during that spring) was initiated by the clockwise effect of the "high," which set up a northeastward flow of warm air from the Gulf to New England. This flow subsequently was intensified by the counterclockwise effect of the "low."

Preliminary observations suggested that either the eastern "high" or the Great Lakes "low," by itself, could create conditions favorable for spring migration into New England, but that the combination of the two produced optimum conditions.

Furthermore (and most practicably important) it was found that the development of this favorable barometric pressure-pattern could be detected in newspaper weather maps and detailed radio weather forecasts in time for a southern New England ornithologist to anticipate periods of pronounced diurnal migration and days on which field trips reflected an obvious influx of migrants during the preceding hours of darkness.

The subject deserves careful study, particularly as regards the timing by which the pressure-pattern becomes favorable for particular areas as the season progresses, and the extent to which variations in the ideal pattern favor migration. (Incidentally, this discovery agrees substantially with European findings as outlined by Thomson [1926] in 'Problems of Bird-Migration,' pp. 104–108). Yet it seems possible to predict that a little knowledge of meteorology will enable a New England ornithologist to anticipate (from weather data given him by press and radio) the most advantageous occasions on which to be out afield to observe spring migration.

The writer will be glad to coöperate with any interested person who wishes to investigate the subject further.—Aaron Moore Bagg, *72 Fairfield Ave., Holyoke, Massachusetts.*

RECENT LITERATURE

Birds of Kutch.[1]—Mr. Salim Ali, whose work on Indian birds is so well known, is to be congratulated upon the appearance of this volume which is a notable addition to the literature on the Indian avifauna. Kutch is the northwesternmost of the Princely States of Kathiawar, that peninsula projecting out of the western coast of India north of Bombay and more than half way towards Karachi. It is largely a desert zone, made remarkable by the physiographical feature of the Great Rann, a 'billiard table' of over 1200 square miles of barren, salty, waste land, which during the rainy season is frequently inundated for weeks at a time. It is here that the only known breeding ground of the flamingo occurs in India, here the western Indian wild ass is found, and here is the site of the most interesting area for observing bird migration in the whole sub-continent. The position of the country is such that it stands at the corssroads of two main migration routes, one from central and northern Asia running southwest to northeast, the other from eastern Europe and the Middle East running northwest to southeast. It is here that Mr. Ali hopes one day, with the willing and interested cooperation of the Maharao of Kutch and his son and heir, to establish observation and banding posts for migratory studies.

Mr. Ali's book gives a complete annotated list of the birds of the State with thorough references to all the pertinent literature and includes many valuable ecological notes. He lists the flamingo colony of the spring of 1945 as numbering over 200,000 adults with nearly 70,000 young. One interesting feature of the breeding cycle of the flamingos in the area is that not only their nesting may be rudely broken off at any time by adverse weather conditions (drying up of the Rann) in which probably absorption of the ova takes place, but also that in certain seasons there is no nesting whatsoever, during which time, presumably, production of ova is deferred.

'Birds of Kutch' is illustrated with photographs by the author and his colleague, Mr. W. T. Loke, and also with twenty colored plates by D. V. Cowen, the reproduction of which is unfortunately not up to the originals. This work is another example of Salim Ali's devoted attention to the subject of popularizing and creating an intelligent interest in birds in India.—S. DILLON RIPLEY.

Natural history in Cheshire, England.[2]—Mr. Boyd dedicates this volume to the memory of T. A. Coward whose friend and disciple he had been for a quarter of a century. Although he started to keep a "country diary" at the age of nine, the material encompassed in the present volume covers the period, 1933–1945. Although devoted chiefly to observations made in Cheshire, this continuity is broken by accounts of excursions to Wales, and other parts of England, Finland, Sweden, France, Spain, and Morocco.

As indicated by the title, the work is in diary style and although beautifully written, it becomes a little monotonous for prolonged reading. It is obvious that birds hold the chief interest of the author as the volume is replete with observations on spring and fall migrations, nesting, and other life-history details. Records of ringed (banded) birds, marked both at home and abroad, are scattered through the pages and in one section reference is had to the author's experience in operating traps. The local status of migratory waterfowl comes in for regular attention.

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[1] SALIM ALI, 'The Birds of Kutch,' with thirty-two photographs and twenty colored plates. Large 8vo. Oxford University Press, 1945. Price 20 Rupees.

[2] BOYD, A. W. 'The Country Diary of a Cheshire Man.' 8vo., pp. 1–320, numerous photographs, 1946. Collins, 14 St. James Place, London S. W. 1, England. Price 12s. 6d.

Mr. Boyd's interest in natural history extends, however, to other fields as there is frequent comment on insects, amphibians, mammals, plants, and even mollusks. In connection with these, frequent reference is made to local folklore in which he at times uses old English words and phrases. The excellent illustrations which figure landscapes, birds, insects, and plants, are the work of several photographers.

The book itself is well printed and put together and will provide many hours of pleasant reading.—F. C. LINCOLN.

National Parks and Monuments.[1]—The United States has a splendid asset in the National Parks and National Monuments that have been established through the years since Yellowstone Park was set aside in 1872. Not all the beauty spots or desirable homes for wildlife in the country have been saved for posterity in this way and those already established are by no means assured of permanence since they are under constant siege, either from vested interests that wish to have them opened for private exploitation, or from groups that want them turned into resorts and playgrounds of another sort. Some such efforts in the past have unfortunately been successful and have resulted in irreparable damage. It is hoped that the present booklet may make more friends interested in keeping these resources intact.

Twenty-six Parks and thirty-eight Monuments are individually discussed in this book, with a brief description of each area, its position and extent, its special attractions, something of its flora and fauna, perhaps its geological or more recent history, its accessibility, accommodations for visitors, and the seasons when it is open to the public. A fine series of photographs show the great variety of scenery to be found in these national domains and some of the plants and animals existing in them. The "National Primeval Parks Standards" of the National Parks Association, under whose aegis this book was prepared, are given, detailing the Association's recommendations for the adequate administration of these areas. There is also a brief account of certain of the "Nature Reservations Abroad" and a useful list of titles for further reading on the subject under discussion. The booklet deserves wide circulation and should interest those persons familiar with our national parks as well as others who have still to make their acquaintance.—J. T. ZIMMER.

Birds in photographs.[2]—Mr. Cruickshank's artistry in photographing birds has long been recognized. In the present collection of his pictures he has selected a series of avian portraits that amply sustain his reputation. Some of them have appeared previously in various places but their excellence justifies their reprinting here. Such, for example, is the unusual view of a Gannet about to make a "three-point landing." The beautiful symmetry of the Roseate Spoonbill and of the White Ibis in flight could not be shown to better advantage except perhaps in color, and other portraits are equally fine.

A brief paragraph or two, descriptive or anecdotal, accompanies each plate. The scientific name supplied for each of the species figured is that of the Fourth Edition of the A. O. U. Check-List without correction according to the subsequent Supplements which, perhaps, should have been consulted to bring the titles up to date if the Latin names were, indeed, necessary here.

Readers interested in the details of the photographic work will find a short discussion in the preface concerning photography of birds, and at the end of the volume the data with respect to the camera, lens, exposure, aperture, and filter used for each

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[1] BUTCHER, DEVEREUX. 'Exploring our National Parks and Monuments.' 8vo, pp. 1–160, 65 figs., 1 map, 2 cover-figs. (col.), June 12, 1947. Oxford University Press, New York. Price, $1.75.

[2] CRUICKSHANK, ALLAN D. 'Wings in the wilderness.' 4to, (unpaged), 125 pls., Oct. 2, 1947. Oxford University Press, New York. Price, $6.00.

of the pictures. Whether or not the reader is a photographer, he will enjoy the excellent results shown in the plates.—J. T. Zimmer.

Birds of Malaysia.[1]—A handbook has long been needed to help the resident in, or visitor to, the Malaysian region to identify the birds he might find in that extensive area. Portions of the region have been variously treated in older ornithological works of one sort and another but they are not fully comprehensive nor up to date, nor are they compact enough to serve as handbooks if, indeed, copies of them are easily obtainable. There has been no single volume of the sort which is presented here in this latest addition to The Pacific World Series.

The region as covered in this volume embraces some 600,000 square miles of highly varied terrain supporting an extremely rich avifauna, largely endemic, with some affinities to adjacent regions. Captain Delacour has recognized some 780 species of which 660 are resident breeders and only 120 are visitors. The grouping is on a broad pattern, not only as regards species, but also with respect to genera and some of the families, with the result that parts of the arrangement may appear unfamiliar to bird students accustomed to the nomenclature of the earlier monographs and reports. The emphasis unquestionably is on relationships rather than distinctions.

The descriptive matter, in most cases, covers each species as a whole, but the various subspecies are mentioned with their individual distributions. Where notable racial distinctions are evident, the subspecies may be given special treatment. Common names are given only for the full species.

On the same generalized pattern, the behavior and other such characteristics of related species are given by families or their major subdivisions, although special details may be added for certain forms. There are very useful, simple keys for the identification of the members of each family or its major subdivisions, where there are more than one or two species to be considered. Line drawings of many of the species, by Earl L. Poole and Alexander Seidel, are, with few exceptions, excellent and lifelike.

With this book in hand, therefore, anyone visiting Malaysia should have the minimum of difficulty in the determination of those birds that he can see clearly enough to note the necessary details of form and pattern. There are many things yet to be learned about the lives of the birds of this distant country that there is a real opportunity for competent observers to add greatly to our existing fund of knowledge, and identification of the species concerned is of prime importance. For this there is no better guide than the present handy volume.—J. T. Zimmer.

Darwin's Finches.[2]—The finches of the Galápagos Islands have occupied a prominent place in zoological study ever since they impressed Darwin in 1835 and led to his monumental speculations. The name 'Darwin's Finches' which Mr. Lack has adopted for them is thus a particularly happy choice and is worthy of universal acceptance. There is no doubt that they have continued to offer an unexcelled subject for the study of evolutionary processes and many authors have taken advantage of it. The latest and most satisfactory treatment is that given in the present work.

Mr. Lack visited the islands in 1938 to gain a personal acquaintance with the terrain and with these birds in their native home. Living examples of some of the species were brought back with the hope of laboratory study but world conditions prevented the fulfillment of the plan. Detailed examination of large series of

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[1] Delacour, Jean. 'Birds of Malaysia.' Demy 8vo, XVI + 382, figs. 1–84, map (end-papers), July 29, 1947. Macmillan Co., New York. Price, $5.00.

[2] Lack, David. 'Darwin's Finches.' 8vo, X + 208, frontisp. (col.), pls. 1–8 (3 col.), figs. 1–27, tables 1–32, A–E, June 3, 1947. Cambridge University Press (Macmillan Co., N. Y.). Price, $4.50.

specimens in the larger collections of this country and England were made to round out the available evidence and a report was subsequently prepared and published as No. 21 of the Occasional Papers of the California Academy of Sciences, 1945. The present work develops the study in its evolutionary aspects with some alteration in the earlier views of the author.

Lack recognizes four genera and 14 species of these finches—a classification which is comparable, with some modifications, to Swarth's earlier arrangement. Considerable discussion is given to the differences in bill size which are considered as adaptations for taking food of varied sizes and which have resulted in food specialization enabling species with only slightly different food habits to live side by side without serious competition. Some of the species, furthermore, occupy somewhat different food niches on separate islands due to different groups of competitors on each. While the size and shape of bill appear to be highly adaptive in nature, not all the recognized specific characters of these birds are clearly adaptive although there may be other distinctions yet to be discovered that are so.

An interesting evolutionary tree is presented showing the probable lines of descent of the various species from each other or from the common ancestral stock. The single ancestor from the American mainland is unknown and it is suggested that it may be extinct or that Darwin's Finches have evolved too far to reveal the relationship. The purely oceanic origin of the Galapagos Islands is maintained as is the discontinuity of the islands from one another. Degree of endemism was found to vary directly with the isolation of each island and isolation is held (as it is usually considered elsewhere) to be of primary importance in the origin of new species.

As a basic thesis, the book maintains that the adaptive radiation of Darwin's Finches developed through differentiation of isolated geographical forms that subsequently invaded islands already occupied by other forms, leading to subdivision of the food supply and habitat among the competitors with consequent increased restriction of ecology and further specialization of structure.

It is impossible, in a brief review, to mention all of the points brought out in this important discussion. The data leading to the author's conclusions are presented in detail and variously tabulated, documented, and figured. All students of evolution, whether of birds or of other groups, will find it highly profitable to read Mr. Lack's most excellent and thought-provoking volume.—J. T. Zimmer.

Birds at Ottawa.[1]—Brewery Creek flows near the city of Ottawa and empties into the Ottawa River by a broad estuary whose banks are little disturbed by the proximity of the city. Across the river is the residence of the High Commissioner for the United Kingdom to Canada. From 1941 to 1945 this post was held by the Right Honourable Malcolm MacDonald who found time, during those troubled years, to employ brief periods of relaxation in watching birds.

He chose for this purpose the estuary of Brewery Creek. This he reached by crossing the river on skis or snowshoes when it was frozen and by canoe when the water was open. In the present volume he recounts his observations during most of the year 1945. The account begins, for practical purposes, in March when the area began to show the first signs of returning spring, and continues by months until well into December.

Due to the regularity of visits to this limited area, Mr. MacDonald was able to follow the history of certain individual birds through their nesting cycles although, as he explains, the arrangement of the whole text by months results in interruption

[1] MacDonald, Malcolm. 'The birds of Brewery Creek.' 8vo, X + 334, 23 pls. (7 col.), Sept. 4, 1947. Oxford University Press, London, Toronto & New York. Price $5.00.

of the history of each of these families. The earlier spring chapters are concerned with the arrival of the migrants, but their behavior also is described whenever it presented items of particular interest. Thus there are notes on courtship display, 'broken-wing' behavior, defense of territory, song, recognition marks, and other such matters. The theory is held at one point that the broken-wing behavior of the Killdeer is linked with sexual display, but later observation of the Spotted Sandpiper weakened the author's assurance of this linkage.

After the breeding season, the observations again renew emphasis on migrants and additions of still more species to the writer's local list. Numerous comments are scattered through the text that show the author's familiarity with birds in other places although the American species, or many of them, were first met on the estuary. In any case, the account contains much interesting information and shows Mr. MacDonald to be a careful observer. In spite of his early disclaimer of any scientific importance in the work, it may be read with profit, and being written with a light touch, it is easy to read.

The plates by Arthur A. Allen and W. V. Crich add to the interest of the book.—J. T. Zimmer.

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NOTES AND NEWS

THE EDITOR is very pleased to report that Mr. Edward A. McIlhenny, who has so generously contributed to the publication funds of The Auk since early in 1942, has renewed his financial support of the journal. With the increased costs of publication and the continuing accumulation of manuscripts by members of the A. O. U., this assurance of additional working funds is most gratifying.

In addition, it is gratifying to note that various contributors to the present number of The Auk have supplied funds as well as manuscripts. Mr. William H. Phelps and Mr. Aaron Moore Bagg have underwritten the publication costs of their papers; Mr. W. L. McAtee has done the same for a portion of the memorial of P. A. Taverner; and Mr. Alexander Sprunt, Jr., and Dr. George M. Sutton have subscribed toward the costs of the plates accompanying their respective articles. This practical coöperation is greatly appreciated.

NOTICE has come to hand of another set of The Auk available for purchase. Mr. Fred M. Dille, Honorary Life Associate, of 822 Grand Ave., Nogales, Arizona, is willing to dispose of his set which is complete to volume 64, including five Ten-year Indexes, and which he values at $250.00, not including transportation.

Mr. A. C. BENT writes that he has completed the manuscript of his 'Life Histories' of the Icteridae and Thraupidae and is ready to receive photographs and notes on the behavior of the Fringillidae. All members of the A. O. U. who have material of value concerning the species from the cardinals to the crossbills, inclusive—which will comprise the first volume on this family—are urged to send it to Mr. Bent.

OBITUARIES

ALIPIO DE MIRANDA RIBEIRO, a Corresponding Fellow of the American Ornithologists' Union, died in Rio de Janeiro, Brazil, January 8, 1939, at the age of nearly sixty-five. He was born in the city of Rio Preto, in the state of Minas Gerais, Brazil, February 21, 1874, and was the son of Theotonio Victor Sayãs and Josephina Mascarenhas de Miranda Ribeiro. His education was received in the schools of Rio Preto and at an early age he developed an interest in natural history. Later at Rio de Janeiro he entered the Colégio Malvina Reis where he met the mathematician, Timotheu Pereira, and the mineralogist, José de Santa Maria Amaral. On completion of his course in secondary schools he entered the School of Medicine of Rio de Janeiro.

About 1899, Miranda Ribeiro began to publish, and his bibliography covering the next 40 years contains about 130 titles. For the most part these papers were devoted to ichthyology, but about 1926 he began a series of 'Notas Ornitologicas' in the Archives of the National Museum at Rio de Janeiro, including a paper on the Seriema and a monograph of the tinamous of Brazil.

On May 31, 1911, he left Brazil on an extended European tour, visiting the Naples Zoological Station, Rome, Florence, Genoa, Monaco, Turin, Verona, Breslau, Hamburg, Paris and London. On his way home he visited New York and Brooklyn and sailed for Rio on December 8. In the following year he was appointed Inspector General of Fisheries and authorized to establish the first fishery service in Brazil. In the course of his work he visited many parts of the country. In 1918 he was called to São Paulo to arrange the collection of fishes in the Museu Paulista, and again in 1921 to arrange the collection of batrachians in the same institution. His biography, in Portuguese, with a portrait and bibliography, was published in 1942, in São Paulo, by D. José Kretz as a 'Conferencia biographica.'—T. S. PALMER.

JUNIUS HENDERSON, a Member of the American Ornithologists' Union, died at Boulder, Colorado, November 4, 1937, in the sixty-third year of his age. He was the son of Henry Clay and Iantha (Fuller) Henderson and was born at Marshalltown, Iowa, April 30, 1865. From 1887 to 1892 he edited the 'Pacific Sound Mail' at La Conner, Washington, was admitted to the Colorado bar in 1894, and practiced law at Boulder, Colorado, until 1902. The following year he became curator of the Museum of the University of Colorado. In 1908 he graduated from the University with the degree of A.B. and became Professor of Natural History.

Henderson was elected an Associate of the Union in 1903, a Member in 1929, and contributed occasional notes to 'The Auk.' His publications on geology and ornithology number more than 150 titles and include contributions to 'The Condor' and the 'Bulletin of the Wilson Ornithological Club.' His principal work, entitled 'The Practical Value of Birds,' appeared in 1920 and was intended as a comprehensive digest of the literature of economic ornithology published in America. How well he succeeded in this ambitious undertaking may be gathered from the review in 'The Auk.' In addition to his membership in the Union, Henderson was a Fellow of the American Association for the Advancement of Science, and the Geological Society of America, and a member of the American Association of Museums, Ecological Society of America, American Society of Mammalogists, California Academy of Sciences, Cooper Ornithological Club, Wilson Ornithological Club, Biological Society of Washington, Palaeontological Society of America and other organizations. He married twice: (1) Nellie Bartlett of Rockford, Ill., May 25, 1894, who died in 1924; and (2) Bess R. Green, September 10, 1929.—T. S. PALMER.

FREDERICK HALL FOWLER, an Honorary Life Associate of the American Ornithologists' Union, elected in 1892, died at Palo Alto, California, November 7, 1945, at the age of sixty-six. He was the son of Major Joshua Lounsbury and Marion Hall Fowler and was born March 30, 1897, at Fort Custer, Montana, while his father was stationed at that frontier post. He graduated from Stanford University and in 1907–1908 returned to his alma mater as instructor in civil engineering. At an early age he took an interest in birds and natural history. He was a member of the Cooper Ornithological Club and was elected to the A. O. U. when only 13 years old.

By profession a civil engineer, he was at one time consultant for the water and power departments of the city of Los Angeles and adviser in the Public Works Administration on the Grand Coulee and Bonneville dams. He was a member of the President's Board of Review of the Atlantic-Gulf Ship Canal in Florida and many other engineering committees and commissions. During the First World War, in 1918, he served as captain and topographic officer of the 211th Engineers at Camp Meade, Maryland, and in 1941 he was President of the American Society of Civil Engineers.

Fowler was author of many official reports and technical papers, but his principal publication was 'Hydro-electric Systems of California,' 1923.—T. S. PALMER.

FRANKLIN DELANO ROOSEVELT, an Honorary Life Associate of the American Ornithologists' Union, died suddenly at Warm Springs, Georgia, April 12, 1945, at the age of 63. He was born at Hyde Park, N. Y., January 30, 1882, the son of James and Sara (Delano) Roosevelt. He graduated from Harvard in 1904 and received his law degree from Columbia University in 1907. In 1910 he entered politics and was elected to the State Senate from the Hyde Park District. Three years later he resigned from the Senate and was appointed Assistant Secretary of the Navy, a position which he held until 1920. He served as Governor of New York from 1929 to 1933 and as President of the United States from 1933 to 1945.

Roosevelt was elected an Associate of the Union in 1896 at the early age of 14 and continued his membership until his death. During his administration, several important changes were made affecting birds and wildlife. Under the Reorganization Act in 1940, the Biological Survey was transferred from the Department of Agriculture to the Department of the Interior and combined with the Bureau of Fisheries to form the Fish and Wildlife Service, the system of migratory bird reservations was greatly expanded, the Act making the Bald Eagle a National Bird and symbol of freedom was passed in 1940, and the Natural Resources Treaty with 18 Latin American republics, providing for the establishment of National Parks and Monuments, Nature Monuments and the protection of migratory birds, was signed in 1940 and ratified in 1941. Under this treaty the Trumpeter Swan, Whooping Crane, Eskimo Curlew, Hudsonian Godwit, California Condor and Ivory-billed Woodpecker were made nature monuments and given federal protection at all times.—T. S. PALMER.

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ALL MEMBERS

The Treasurer and Business Manager desires to thank those members who have returned their copies of The Auk for January, 1947. Their generosity has made possible the inclusion of this number in sets that would otherwise be incomplete.

The need for additional copies is still urgent so it is requested that any other members who do not intend to maintain a permanent file of The Auk, return their copies of the January number as soon as they are through with them.

FREDERICK C. LINCOLN
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